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7 OCT 1988

Chemical Weekly

VOL. XXXIV


OCTOBER 4, 1988

NO. 4

NEW PRODUCT RANGE FROM MERCK

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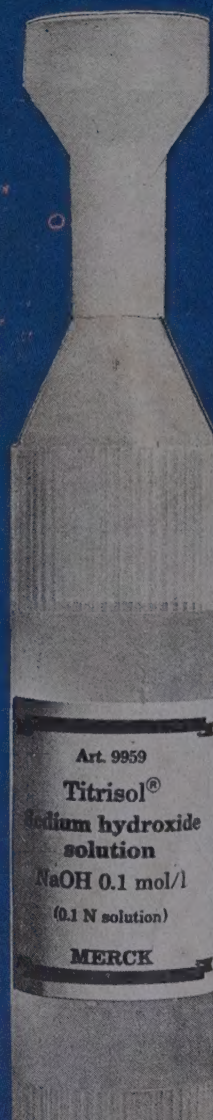
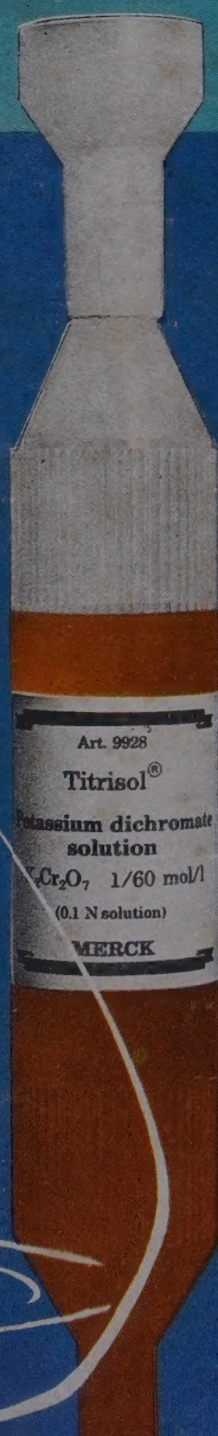


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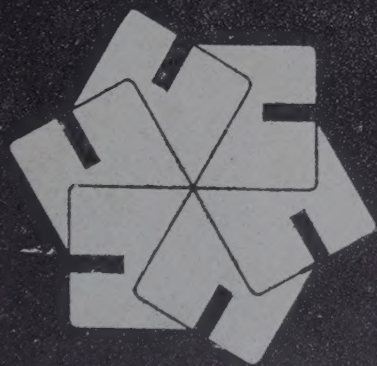
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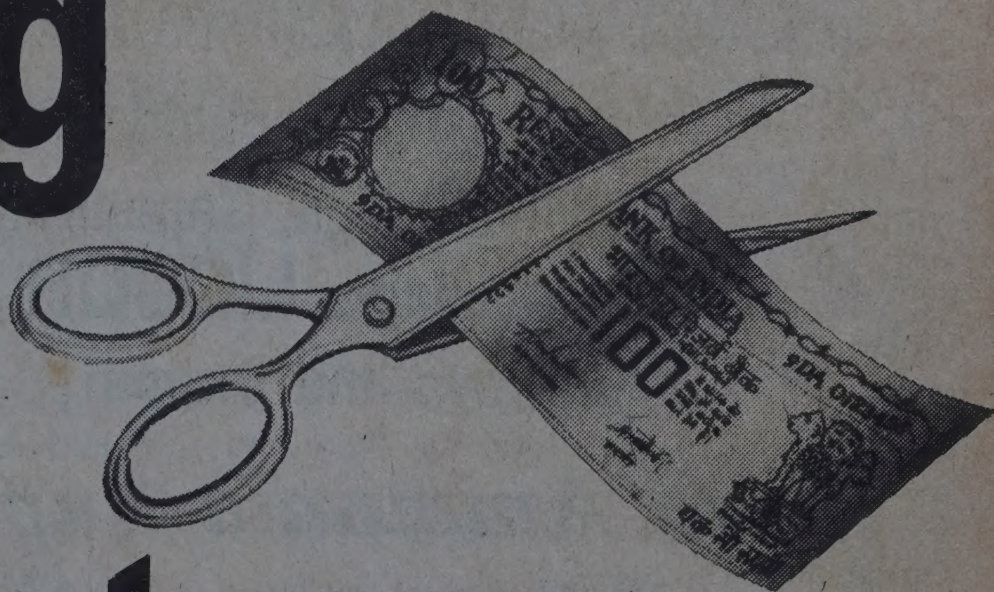


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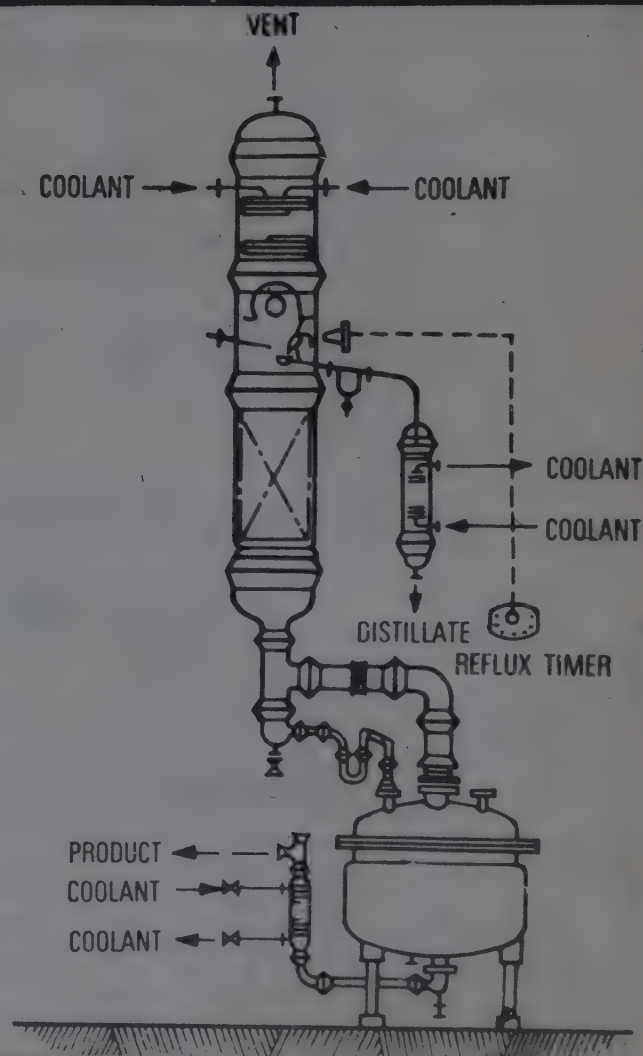
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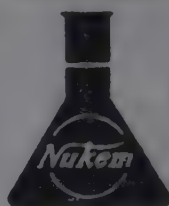
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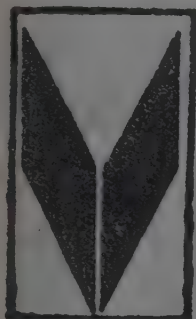
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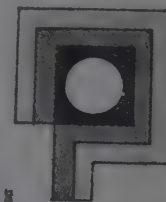
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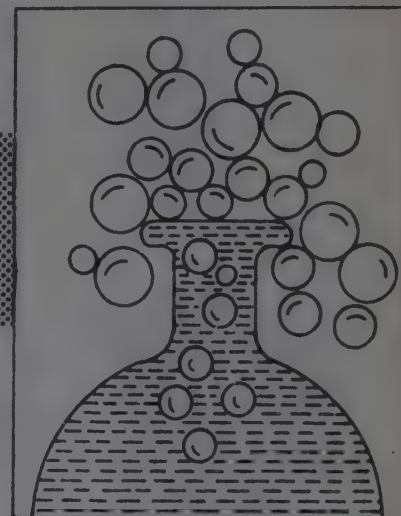
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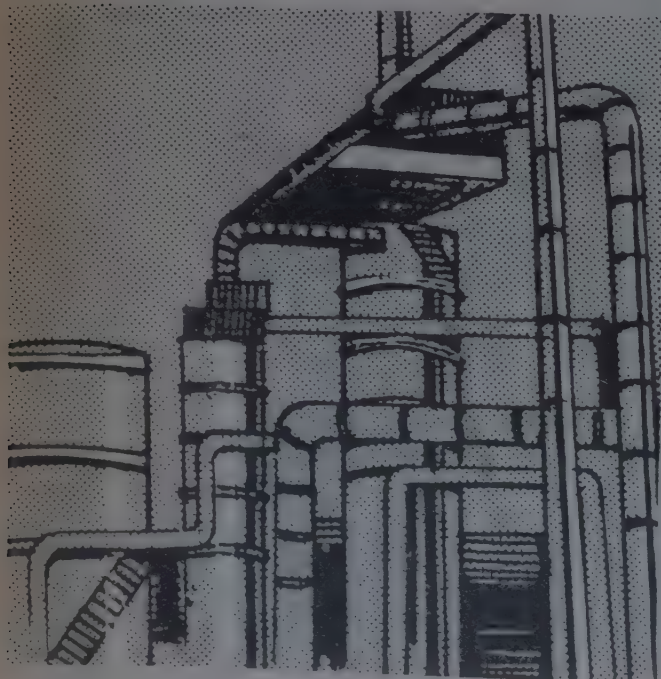
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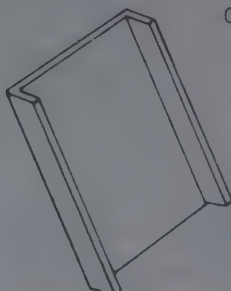
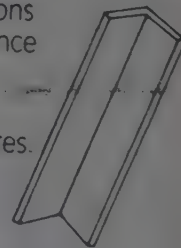
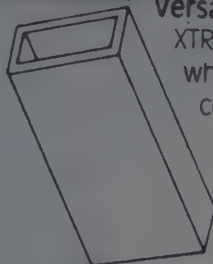
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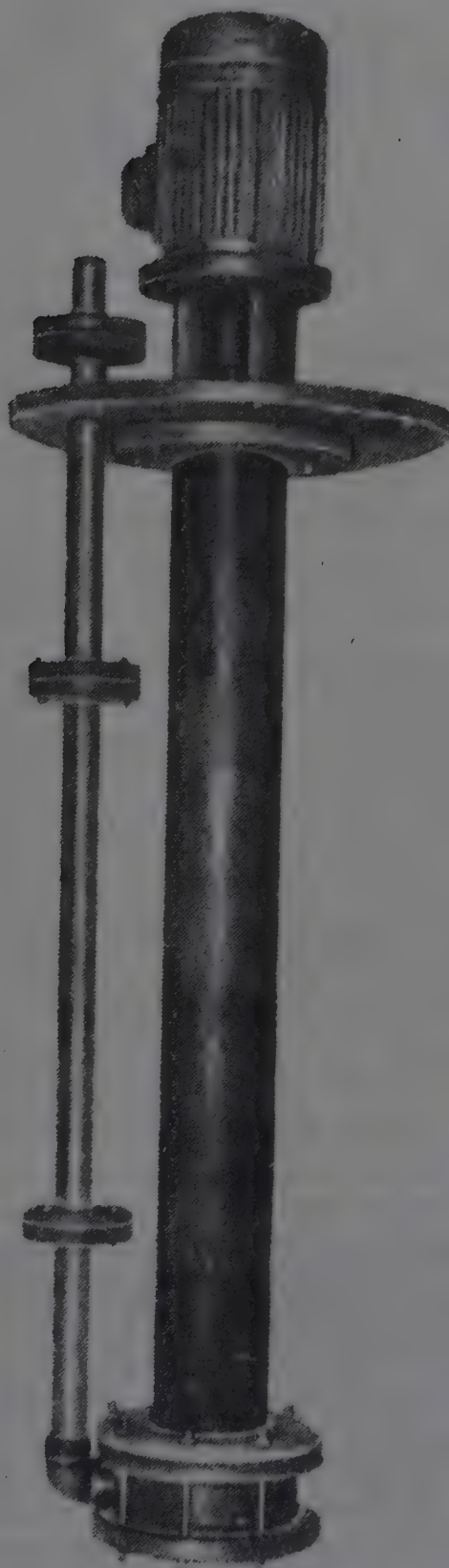
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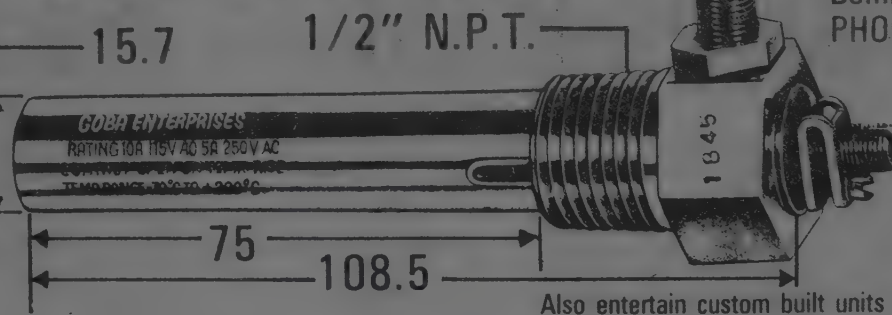
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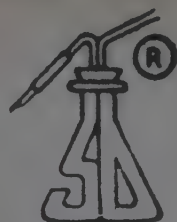
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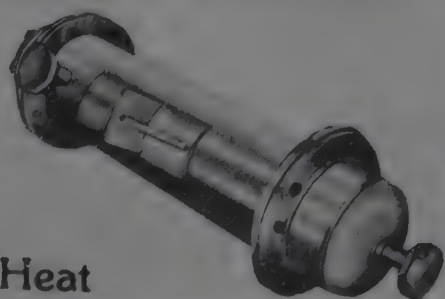
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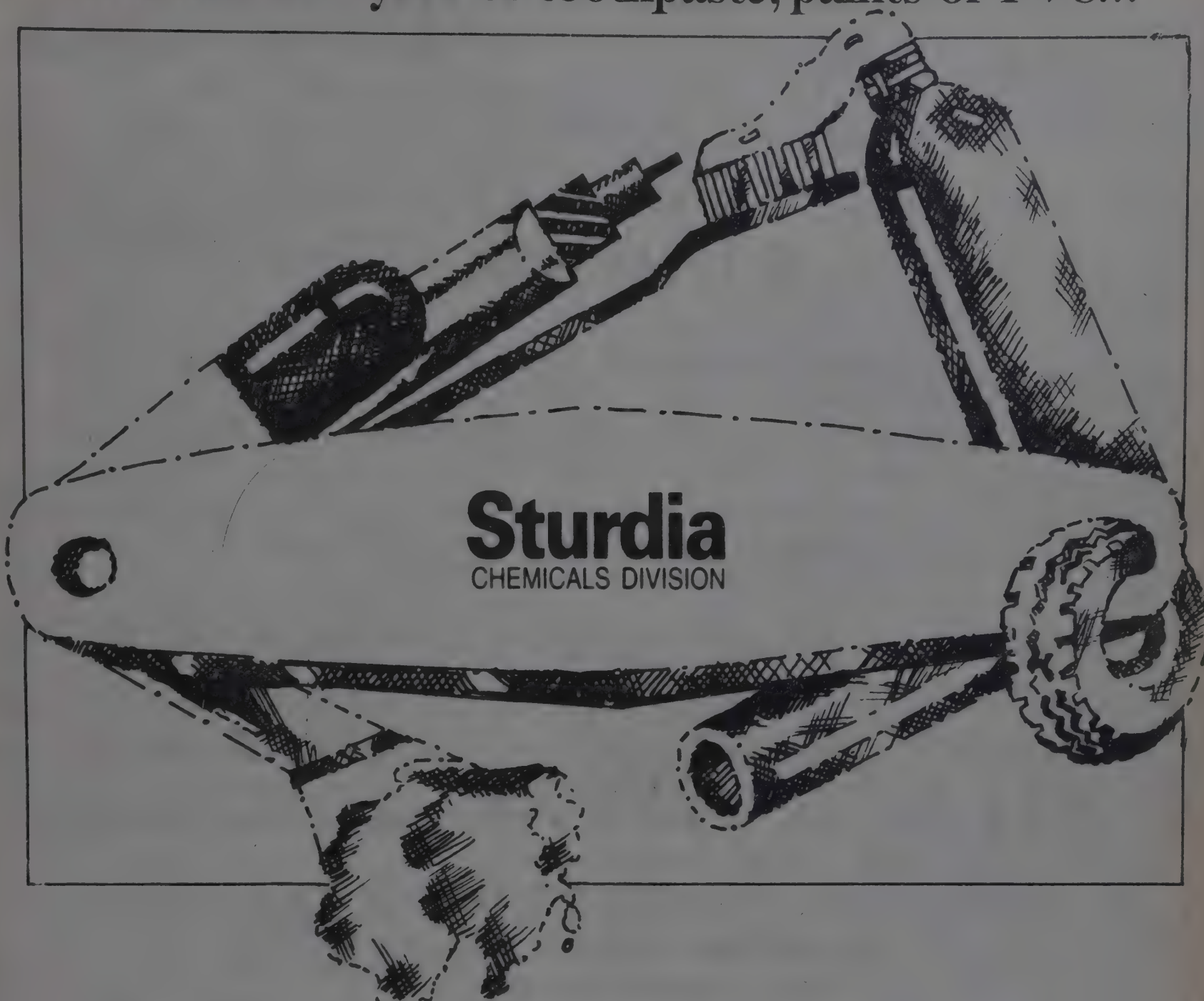
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CHEMICAL WEEKLY

VOL. XXXIV

OCTOBER 4, 1988

NO. 4

Steep increase in Copper and Zinc Imports inevitable

The per capita consumption of zinc in the country is about 180 grams and that of lead is about 100 grams as compared to 67 kg of zinc and 5.14 kg of lead in West Germany and 203 grams of zinc and 219 grams of lead in China. By the turn of the century, the per capita consumption in the country is expected to go up to 281 grams of zinc and 170 grams of lead. The actual zinc production in the country during 1986-87 was 76,366 tonnes, which is estimated to have come down to 60,600 tonnes in 1987-88, recording over 20% fall. The drop has been largely due to water and power shortage in the producing areas, thus increasing reliance on imports to meet the growing demand for this vital metal.

The Government-owned Hindustan Zinc Limited (HZL) produced 66,378 tonnes of zinc during 1986-87, which is estimated to have provisionally suffered a sharp set back at around 48,000 tonnes during last year due to acute water and power shortage in Rajasthan. In the private sector, Cominco Binani Zinc Limited produces zinc from imported concentrates at their Alwaye (Kerala) plant with a production capacity of 14,000 tonnes. Its zinc production is estimated to have increased from 9,988 tonnes in 1986-87 to around 12,600 tonnes last year.

Taking into account the acute water and power situation in Rajasthan, it appears that the target of zinc production by HZL for 1988-89 may be scaled down to 57,000 tonnes, worsening further the indigenous supply position during the current year.

According to the assessment of the working group for the Seventh Five Year Plan, the demand for zinc and lead in the country is envisaged to grow at annual compound rates of about 4.5% for zinc and 5.5% for lead up to 1989-90 and 4% and 5% respectively, thereafter. With these growth rates, the annual demand for zinc and lead will increase to 2.41 lakhs tonnes and 1.30 lakh tonnes respectively by the turn of the century from the existing levels of 1.49 lakh tonnes and 79,000 tonnes, respectively. The lead production by HZL during last year is estimated at 20,400 tonnes and by Indian Lead Private Limited at around 12,000 tonnes. The gap in the indigenous zinc and lead production is being met by imports of concentrates and metals.

The total zinc and lead identified resources in the country are around 360 million tonnes. Out of this 157 million tonnes averaging 2.20% lead and 8.31% zinc are the mineral/ore reserves in mining/development stage with recoverable metal availability of 6.9 million tonnes of zinc and 1.7 million tonnes of lead ore in the category of conditional resources with an average of 1.17% lead and 2.43% zinc. The bulk of lead zinc deposits occur in Rajasthan and are under lease/exploitation of HZL. The best ever multi-metal deposit discovered in India for zinc, lead and other associated metals is Rampura-Agucha in Bhilwara district of Rajasthan. It has estimated ore reserves of 60.35 million tonnes containing 13.48% zinc and 1.93% lead metals.

The UK/India Hindustan Zinc Aid agreement signed last year offers grant-in-aid upto £ 55.3 million to cover substantial cost in the form of off-shore supplies and services from the UK and proportionate local costs in rupee equivalent upto £ 18.3 million for Indian supplies for Rampura-Agucha mine and Chanderia smelter project. HZL, started with a 500 tonnes per day mine at Mochia in Zawar in Udaipur district of Rajasthan and 3,600 tonnes per year lead smelter at Tundoo in Bihar. In addition to the primary metals of zinc and lead, the production profile of the company includes by-products such as cadmium, silver, sulphuric acid and phosphoric acid.

The zinc consuming industries are in jitters over the continuing rise in the price of the base metal on the London Metal Exchange (LME). The price increase has been particularly sharp since the middle of June. Presently, the metal is traded at around 60 US cents a pound against last year's average price of 35 cents. Metal experts both within and outside the country have forecast that there will be further rise in zinc price in the coming months.

Zinc is extensively used in almost every important sector of the economy from galvanizing in steel industry, power transmission, casting, to essential commodities such as dry cell batteries. An increase in the zinc price announced by the MMTC from Rs. 31,500 per tonne in January 1988 to Rs. 38,000 has hit hard the battery industry. Such a steep hike of 21% in the raw material cost in a

short period of five months can hardly be absorbed or passed on to the ultimate consumer, so the entire burden has come on the battery industry.

Battery manufacturing units were not doing well and some of them have already downed their shutters. This unprecedented hike in zinc price may adversely affect the surviving units, unless the authorities take urgent measures to bring down price by suitable adjustment in import duty. Rural areas constitute a major market for dry cell batteries and considering the low purchasing power of the major segment of the consumers, it is very difficult to pass on any cost increase on the consumer. The Union Carbide, Indo-National, Lakhanpal-National and Toshiba Anand are some of the major battery suppliers to market.

Being a large importer of zinc, India's concern over the price inflation in the world market is understandable. In spite of the good monsoon in the current year which helps in improving hydel power generation it is doubtful whether the zinc production target will be achieved. This explains why India is buying heavily. In fact, Japan, China, Taiwan and South Korea are also making substantial imports of the metal. These heavy purchases are being made at a time when quiet a few mines in the major zinc producing countries are encountering production problems. An interesting point to note is that world zinc consumption has been growing at an annual rate of 4.3% in the last two years against less than 2% during 1983-86. This is largely because there has been a spurt in demand for the metal from the automotive and galvanising industries.

Domestic prices of major non-ferrous metals, including zinc and lead, are likely to follow a downward trend in the near future before stabilising at reasonable levels, according to Chairman, Hindustan Zinc Limited (HZL). This prediction was based on the high level of prices for these metals prevailing on the London Metal Exchange (LME), a situation that could not continue indefinitely. In the case of lead, the highest price had been reached during July-August 1987 while zinc prices had peaked during June 1988 and were subsequently in a declining phase.

As domestic prices generally followed international levels, with a certain time lag and variations in the exchange rate of rupee, it could be predicted, with a fair amount of certainty, that Indian prices of zinc and lead will also decline in the foreseeable future, he said. Another opinion that the international non-ferrous metals market was going through a sea-change with demand for most metals increasing every year while commensurate supply sources were not available. Such a situation might result in drastic changes in consumption patterns.

In its bid to diversify into the related area of corrosion resistant alloy coatings, HZL has drawn up a scheme to manufacture zinc-aluminium and lead-antimony alloys which would find applications in the construction and automobile industries. The company, which recently acquired membership of the International Lead Zinc

Research Organization (ILZRO), USA, is presently in the process of obtaining a licence from this body for manufacture of 'Falfan', an alloy containing 95% zinc and 5% aluminium capable of withstanding rough usage under Indian conditions.

Copper imports are expected to rise considerably in the years to come as the demand for the metal is steadily increasing, while the indigenous production is not keeping pace with the demand. The consumption of copper during 1986-87 was 1.04 lakh tonnes, the demand is likely to rise to 1.35 lakh tonnes by 1988-89, while by 1990, the expected copper concentrates and reverbs generated by the Hindustan Copper Ltd. (HCL) would be toll-smelted abroad.

The actual ore production by the HCL during 1986-87 was 45.22 lakh tonnes, which is estimated to have gone up to 49.16 lakh tonnes of ore during 1987-88, a 9% increase. Despite a shut-down of KCC smelter/refinery plants for two months and that of ICC for one-and-half months during 1987-88, HCL is expected to produce 37,100 tonnes of refined copper, against the previous full year's production of 37,100 tonnes of blister copper and 33,190 tonnes of cathode during 1987-88 would mean a capacity utilisation of 78% and 79% respectively. The company achieved a record sale of 50,644 tonnes of copper during 1986-87 and it is estimated to total 49,000 to 50,000 tonnes (includes toll-smelted wire rod) during 1987-88.

Malanjkhand copper project is the largest hard rock, open-cast mine in the country with a designed production capacity of two million tonnes of ore and matching concentrator plant equivalent to 23,000 tonnes of copper metal per annum. The first stage of the project at one million tonnes of copper ore per annum was completed in July 1982 and the commercial production started from November 1982. During 1987-88, the project is expected to produce 19 lakhs tonnes of ore, against the previous year's production of 15.54 lakh tonnes, registering a growth of 22% over the previous year. It is estimated that the production of metal in concentrates in the year would be around 22,500 tonnes. While a part of the concentrates produced at Malanjkhand are fed to the Khetri Smelter, the surplus concentrates are sent abroad for toll-smelting and are received in the form of wire-rods.

While the indigenous copper production may reach around 50,000 tonnes, the demand is expected to go up to 1.35 lakh tonnes in the current year, from 1.29 lakh tonnes estimated for the last year. With a rapid development in the electronics, electrical and communication industries, the future demand for copper in the country is expected to increase at a much faster rate, while the indigenous production is unlikely to keep pace with the demand, resulting in more dependence on imports, according to industry circles. Copper imports during 1984 were placed around 48,500 tonnes, valued at Rs. 75 crores. In 1985 the imports were over 85,500 tonnes (Rs. 157 crores) and in 1986, 72,500 tonnes (Rs. 129 crores).

-- T.P.S. RAJAN

CHEMARENA

S.L. VENKITESWARAN

Chemist Princess of Thailand

It is heartening to read that a Thai Research Institute is headed by a Royal Princess qualified as a Ph.D in Chemistry and the entire effort is due to the royal initiative. The Chulabhorn Research Institute was established a few months back and will focus on chemistry to develop natural resources, agricultural and other products and transforming these to valuable end products. The youngest daughter of the king of Thailand, aged 30, is a member of the American Chemical Society, a Ph.D of Bangkok University and recipient of the Einstein Medal of the UNESCO in 1986. The objectives of the Institute are far better living through chemistry.

The Institute will be financed mostly by Government but managed by a private sector organisation and with financial support from Japan and other international sources. One of the main areas will be medicinal plants and food plants and fish crops. Institute's Laboratory facilities will take 2 years to come up but work will start in University Laboratories. Research on medicinal plants

serves as a good example of how the Chemistry of natural products can be used through the chemical processes to get active pharmaceuticals. There are a large variety of such plants in Thailand's forests. Zingiberaceae family is getting most attention and anti-inflammatory, hypertensive and cytofoxic, bronchodilatory and uteronic active compounds are being sought. The plant constituents can be used as precursors for active compounds and the plants can be cultivated and genetically improved.

The Institute will also take up problems of environmental toxicology and studies on pollutants and their long term effects on physiological functions. There will also be breeding activity of high quality fish. The more immediate problems of disease and pest resistance of rice and other cereal plants will also be tackled. The princess is a lecturer and faculty member of Bangkok's Mahidol University. One would wish all the best and early successes for such royal chemical activities.

Kudos to Indian R & D

POLYSILICON

Recently the Chemical Industries Association of Madras arranged a special function to felicitate Shri R.V. Ramani (see *CHEMICAL WEEKLY* dated 6-9-1988) who was instrumental in the development of indigenous technology for polysilicon at Mettur Chemicals of which he was the Managing Director. The R & D was carried out at the Indian Institute of Science, Bangalore under Ramani's inspiration. It was indeed a hard grind for Ramani and the scientists in the face of severe criticism of an endgame which the "experts" predicted would be futile. Undaunted and silently the efforts continued at Bangalore and Mettur until a pilot plant was set up to produce the sophisticated material for tests and trials. Again a long process of evaluation was gone through and the Indian polysilicon was acceptable for computer chips and solar cells to the astonishment and disbelief of the critics in and out of the Government agencies and the efforts to get foreign technology from

Hemlock of USA were frustrated. Committees were asked to go into the Indian technology, product and economics while Hemlock was already paid part of a hefty 30 million dollars and the National Silicon Facility was set up to implement the project based on it.

However it was obvious that the polysilicon produced in the NSF would be too costly largely due to the high capital cost and capacity unrelated to the actual demand of the country. A final analysis initiated by the Prime Minister proved the way for Metkem to be established and supported, meeting the country's needs of polysilicon based in silicon trifluoride. Single minded extension to the set aims by the scientists concerned and Shri Ramani's guidance and unperturbed efforts in the face of uninformed criticism has enabled the country to have Metkem on way to be premier producer of this vital material. Costs and prices are invariably high under Indian conditions and could not have been different on imported technology.

It should be a matter of national pride that Shri Ramani's efforts have come through and Shri Ramani rewarded with a token as the nation's gratitude, by award of Padmashri recently, and the far more treasured momento of a technical body like the Chemical Industries Association.

ETHYL BENZENE

There is another success story of Indian R & D and this time from NCL, Pune which is a premier centre for catalyst research. Their efforts over several years to develop a molecular sieve type catalyst for alkylation of benzene directly by alcohol has borne fruit. The process is said to have been extensively tried out on a large scale at one of the present ethyl benzene plants in India and the obvious economics of such a process which bypasses the conventional alcohol to ethylene step have emboldened the party to change over to the direct process for ethyl benzene from benzene and alcohol.

They have a distillery of 40 KH alcohol per day which can be used to produce 15,000 tonnes of ethyl benzene per year at a saving in capital and operating costs. This new technology which is economic at 15,000 TPA or even lower opens the way for ethyl benzene production in a number of units for feeding into a central dehydrogenation plant to make styrene from ethyl benzene.

Not content with this breakthrough NCL have also developed a more active catalyst for the dehydrogenation step which works at a lower high temperature steam to ethyl benzene ratio. This again leads to economic advantages and the new catalyst is being evaluated at a styrene plant in the country. Indications are that this would be equally successful and problems on catalyst life and regeneration are said to be under control.

Thus overall, NCL could be proud of their efforts in developing appropriate technology to link India's alcohol production to styrene at a lower cost and without foreign know-how. Incidentally all the three styrene plants in the country have been using alcohol exclusively as a source of ethylene though one of these switches over to petro-ethylene when available.

PROPIONIC ACID

NCL, Pune, have also pioneered R & D on the carbonylation of ethyl alcohol to propionic acid on the same lines as methanol to acetic acid technology which is widely used. The precious metal Rhodium is used as the base of catalyst and NCL have successfully completed bench scale trials a few years back. Although this work was sponsored the process has been languishing for want of sponsorship for a prototype unit of fairly high cost to fully try out this breakthrough technology. There are indications that NCL have succeeded in going back to the methanol -- acetic acid conversion using the catalyst developed for propionic acid from ethyl alcohol. This has attracted attention and sponsorship because a plant of semi commercial size for propionic acid can be the fore-runner of methanol to acetic acid based on indigenous R & D as and when it is needed by the country. Here again we have successful R & D efforts on a breakthrough technology ready for exploitation if the Government in its benign wisdom scotches the potential through import of technology for acetic acid from methanol at a high cost when the country has no real need for it at present. It is to be hoped that we do not see a repetition of the polysilicon case and efforts for indigenous R & D scotched at high levels.

SULFAMETHOXAZOLE

Another outstanding success of Indian efforts is on a process for the valuable sulpha drug sulfamethoxazole from totally different intermediates -- in this case diethyl oxalate acetone and ethyl acetate all readily available and lower in cost than intermediates on which this drug was developed abroad. Over a period of years the process has spread to a number of small to medium scale units producing specification material and now there are exports on a bigscale. The process development was outside the National Laboratories and through Indian scientists operating on their own -- particularly Dr. Reddy and his organisation in Hyderabad.

There is no doubt that India can do it if the goals are clearly defined and obstacles are not put in the shape of inducting foreign technology not really needed.

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Nocil exports to touch Rs. 20 crores

Arvind Mafatlal group of companies has proposed a massive "export promotion plan" to the Union government to raise its export from the current Rs 40 crores to Rs 350 crores by the end of the century.

According to the chairman Arvind Mafatlal, the government support for this plan is already forthcoming since it does not seek any concession like cash incentive support.

Under this long term plan, National Organic Chemical Industries Limited (Nocil) would be exporting products worth Rs. 20 crores in 1989-90 and Rs. 100 crores in 1990-2000. Similarly, Polyolefin Industries Limited (PIL) would be exporting Rs. 15 crores worth of its products in 1990 and Rs. 100 crores in 2000.

Moreover, the two textile units of the group — Mafatlal Industries and Mafatlal Spinning and Manufacturing Company would be raising their exports from the current Rs. 40 crores to Rs. 150 crores by 2000.

Mr. Mafatlal said, these two units underwent massive modernisation plans of Rs. 100 crores in 1984-88 and aggressive marketing efforts helped about 80 per cent of its products to be exported.

Nocil and PIL would meet part of their export targets by direct shipment of their products and by "deemed exports" by supplying primary products to processors mainly in the small scale sector for conversion into exportable finished products, he said.

About the expansion plan, he said, much of the proposed export targets would be dependent in future years on the government's approval of Nocil's plan to broaden its ethylene capacity to 300,000 tonnes per annum and PIL's expansion of high density polyethylene (HDPE) capacity to 150,000 tonnes per annum.

In this context, he said, Nocil had already exported 1000 tonnes of acetone worth Rs. 46 lakhs to Singapore.

ZENITH TO ENTER PETROCHEMICALS

Zenith Ltd., the well-diversified Ashok Birla Group company, is entering into the field of petrochemicals such as butyl ether, maleic anhydride,

polybutene and methyl ethyl ketone etc. involving an initial capital expenditure of Rs. 75 crores.

Talking to newsmen in Bombay Mr. Birla said that the company had also received the Government's approval to increase the capacity of its chemical division at Boisar from 900 tonnes to 3000 tonnes per annum.

An agreement for technical know-how, process and basic engineering was concluded with Sitraco, SRL Milano, Italy to achieve optimum production and better yield.

He said that the company had already taken effective steps to implement the expansion schemes which would be financed through internal accruals and convertible debentures.

OSWAL AGRO SETS UP CHEM. PLANT

Oswal Agro Furane has set up a 100 per cent export oriented agro-based composite chemical plant at Dhuri in Punjab incorporating a number of 'largest capacities' for similar plants, both within the country and abroad.

According to a company communique, all plants and equipment — both imported as well as indigenous, have been installed.

With the installation of the rice processing plant, the furfural plant, the solvent extraction plant and the steam boiler, the company now boasts of the largest rice processing plant in the world with an installed capacity of 5,76,000 tonnes per annum. Equipment for this plant has been procured from Buhler Miag of West Germany.

It also has the largest 100 per cent export oriented furfural plant in Asia with an installed capacity of 3,000 tonnes per annum, from Societa Italiana Furfurolo Spa of Italy.

RAMA PETROCHEM WORKING AT 100% CAPACITY

Rama Petrochemicals, which went into commercial production in the middle of April, 1988, has already produced over 25,000 tonnes of methanol of high purity of 99.9 per cent which is comparable to the international standard, according to Mr. A. J. Ramsighani, Managing Director of the company.

Addressing shareholders at the company's annual general meeting in Bombay, he said that during the first five-and-a-quarter months of the current year, the company had sold over 22,500 tonnes of methanol with gross sales value of approximately Rs. 16 crores. The plant is working at over 100 per cent capacity and the company was confident of achieving the turnover target of Rs. 5 crores during the current year.

On the expansion front, he said that all preparatory measures for the implementation of the expansion project had been taken up and the finance for the expansion would be met partly by term loans from financial institutions, partly by rights issue and partly by internal accruals. Some of the projects for diversification are being identified and the same are under consideration.

NATURAL GAS FOUND IN RAJASTHAN

Natural gas with a rich hydrocarbon content of 67 per cent was found by the Oil India Limited last month in its first exploratory well at Tanot in Rajasthan, the oil sources said.

The sources said the well had been producing gas at the rate of 45,000 standard cubic metres a day and the open flow potential estimated at over 14,000 standard cubic metres a day.

The gas is reported to be rich in methane, ethane, propane and butane, factors considered to be excellent for producing liquified petroleum gas.

PLEA FOR UNIFORM ST ON DRUGS

The TN State Pharmaceutical Wholesalers Association has pleaded for a uniform four per cent single point sales tax on drugs and medicines.

A four-member delegation headed by association general secretary C.A. Vasudevan which met the Governor P.C. Alexander at the Secretariat on Sep. 16, also represented that the additional turnover tax on the price controlled commodities of drugs and medicines be totally abolished and the control on medicinal preparations containing 18 per cent and more of alcohol be done away with.

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New BPCL refineries to be in joint sector

Bharat Petroleum Corporation Ltd. (BPCL) has worked out proposals for its two major green field refineries — the Central India and Northwest India projects to be joint sector ventures with the corporate private sector.

The Union Government has asked BPCL to prepare the detailed project report for the six million tonnes per year capacity Central India refinery. The northwest project will also have a lube oil complex.

Speaking to newsmen in Bombay after the annual general meeting, the BPCL Chairman, Mr. R. K. Gajre, said that other major BPCL projects would include the Rs. 269-crore aromatics complex which would manufacture 1,00,800 tonnes of paraxylene and 20,400 tonnes of orthoxylene every year, based on naphtha from Bombay High crude oil.

The Bombay-Manmad pipeline would enable cheaper, cleaner and more efficient transportation of motor spirit, kerosene, HSD and LDO to Manmad, Aurangabad, Aonla, Amravati, Nagpur and Jabalpur. The facilities for producing SBP/hexane solvents from Bombay High feedstock are to be modernised.

BPCL is also setting up a product pipeline from Cochin to Coimbatore. Proposals awaiting Government sanction include a naphtha cracker complex and C4/C5 elastomers complex.

BPCL has also proposed the manufacture of 70,000 tonnes annually of N-paraffins based on the kerosene stream from Bombay High crude. This project also awaits environment sanction, from the Union Environment Ministry.

BPCL earned Rs. 190.25 crores before depreciation, interest and tax on a sales turnover of Rs. 405 crores. The corporation processed 6.5 million tonnes of crude oil of which 5.3 million tonnes was Bombay High crude. Refined products increased to 6.69 million tonnes this year. The aromatics, benzene and toluene production was increased to 54,300 tonnes.

BPCL projects underway include 116,000 kilolitres of additional product tankage. By March, 1991, BPCL's total product tankage will be 14,26,000

kilolitres. The new oil installation facilities at Cochin will provide for tankage for products such as diesel oil, and tanker unloading equipment to cost Rs. 65.21 crores.

Eight new bottling plants for LPG were commissioned and eight more will be completed by December this year.

The Corporation reached its highest ever record of 8.6 million manhours without accidents, for which it has been presented the award of honour by the National Safety Council of the US.

Other major projects in various stages of implementation include the provision of firm power from a captive power plant which will be commissioned in the last quarter of this year. C3/C4 separation facilities at the refinery which are expected to feed the polypropylene plant of the Maharashtra Gas Cracker Complex in Raigad district and various effluent discharges and environment safety measures.

TEAM HI-TECH BAGS JAPANESE ORDER

Team Hi-Tech of Madras has achieved a breakthrough in exports by bagging an order from Japan for three electrolyzers for the manufacture of caustic soda-chlorine. This is the first time that this high-tech product is being exported to an advanced country like Japan.

The entire manufacture was done by Team Hi-Tech engineers who are backed by years of experience in titanium fabrication and coating technology. The design was supplied by Mitsui of Japan and the materials were supplied by the Japanese customers. Team Hi-Tech is located in the Madras Export Processing Zone. The company expects to receive more orders.

Mr. C. H. Krishnamurthy Rao, chairman of Team Hi-Tech said the company was not in a position to spot-purchase the materials with foreign currency. Hence, it had to be satisfied with the conversion of the materials into end-products. Export units operating in high-tech areas should have an international status and for this it is neces-

sary to permit them to operate a dollar account so that they do not lose opportunities of buying the materials at the cheapest price in the international market.

Plenty of orders are available for India in the international market and the country has the expertise and capability to execute orders from advanced countries like Japan, Germany and the US. This is possible only if the exporters are permitted to operate dollar accounts with their own resources and make payments in foreign currency for purchase of materials.

MAHARASHTRA STOPS EXPORT LICENCES OF BANNED DRUGS

Food and drug administration, Maharashtra has abruptly stopped issuing licences for export production of drug formulations which are not allowed to be manufactured and marketed in India.

The government had announced a scheme of allowing manufacture and export of drug formulations which are banned in India but have a market abroad some months ago to maximise exports.

Informed sources in Bombay say that the FDA has turned down a few applications for licences for export production of these items. The FDA officials are reportedly telling the exporters to approach the Drug Controller of India.

Many drug units which have got already sizable orders for export of such drug formulations from countries like Russia and West European countries are thus finding themselves in a fix.

PRIVATE PARTIES CAN EXPORT MOLASSES THROUGH STC

The Government has decided to permit private parties to export molasses on registration of contract with the State Trading Corporation, says an official release.

However, molasses will continue to be canalised through STC, the release said.

The export of molasses will be permitted against export slips to be issued by STC subject to the condition that ratio of molasses exported from non-coastal States origin and coastal States origin is in the ratio of 2:1.

NCL develops catalysts for converting gas into diesel

The National Chemical Laboratory (NCL) in Pune has developed catalysts for converting natural gas into kerosene and diesel, which will be evaluated in a pilot plant before a decision on its commercialisation is taken.

Announcing this at a press conference, NCL Director, Dr. L. K. Doraiswamy expected it would be commercialised on a conservative basis by 1990. He felt it could be economically viable within 10 years.

Dr. Doraiswamy stated there was no such commercial plant in operation today and NCL could be the first to install or export one.

The press conference was in connection with the celebrations of "foundation day" of the Council of Scientific and Industrial Research (CSIR).

According to Dr. Doraiswamy, a number of projects were in progress under four categories.

He stated that the NCL-developed super-absorbant "jalshakti" (a free-flowing powder which swelled into a gel of 200-300 times in volume when mixed with water) had been used as a soil additive in rainfed areas with no irrigation, leading to faster generation and healthier roots.

He said highly encouraging results were obtained from cereal crops (millets), seasonal crops (maize and bajra), vegetables (tomato), horticultural crops (mango), oilseeds (mustard and groundnuts) and pulses (Bengal gram) with increased yield between 15 to 50 per cent.

Unlike the traditional method of producing alcohol from molasses by fermentation of yeast, NCL had developed a process of continuous fermentation of molasses using a special strain of yeast called encitium, the process of which was easily adaptable in existing distilleries.

NCL had developed a shoot-tip culture method of propagating disease-free plants of CO-740 variety of sugarcane with about 20 per cent higher yield, he added.

NCL has also developed polymer formulations named as "drop" for north Gujarat and Assam crude, which would be commercially produced as soon as positive results of tests were received.

The regular use of "drop" would save the Oil India Ltd. crores of rupees

required to put up pipelines for pumping additional quantities of crude, he stated.

When asked about reports that a number of scientists had left NCL, Dr. Doraiswamy said 55 scientists had joined in the past five years while only 17 gave up their jobs. Out of them eight got better jobs. "This is inevitable in a dynamic set-up" he felt, adding that some scientists who were sent abroad never returned.

Pointing out that the basic chemicals in the country were costly leading to processing and end-product being costly, Dr. Doraiswamy expected a change in Government policies. In this respect, he cited the example of silicon which is six times higher than the world's price.

HSL GETS ONGC CONTRACT

The Hindustan Shipyard Ltd (HSL) in Visakhapatnam has been awarded a contract for fabrication of two plat-

forms for the Oil and Natural Gas Commission (ONGC) for its Godavari basin operations.

A high-level meeting was held at HSL on September 26, in which Rear Admiral S.C. Bindra, Chairman and Managing Director of the HSL and Mr. S.S. Paintal, Regional Director of ONGC and a representative of EIL, Delhi, reviewed and finalised the programme of installation, according to a HSL press release.

The first platform, being the maiden platform in the east coast for producing oil, is scheduled to be put into operation by March, 1989 followed by the second one.

POLYCARBONATE FOR FERMENTATION VESSELS

Scientists at Sunderland Polytechnic in northeast England have demonstrated that polycarbonate is an ideal material from which to manufacture fermentation vessels. Until now, such vessels have been made of either glass or stainless steel — respectively fragile and expensive.

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Hukumchand Jute to expand chemicals business

With Hukumchand Jute and Industries Limited is selling off its jute division, the company is now planning to expand its range of chemical products. Addressing the annual general meeting of the company the chairman, G.D. Kothari said a number of new projects were being examined by the company in the chemicals sector. Suitable foreign tie-ups were also being considered, he added. The company has already invested Rs. 10 crores in the chemicals division during the last two years in expanding capacity.

In fact, the disposal of the jute division has come as a boon for the company. This is well reflected on the Calcutta Stock Exchange with the scrip coming in for active trading and seeking higher levels. According to Mr. Kothari, the company's performance would improve significantly in the coming years. The company also planned to change its name after the recent development, he said.

The company handed over its jute mill to Mr. Arun Bajoria's Hoogly Mills Projects Ltd (HMPL) on September 21. Explaining the details of the deal, he said there was a cash down payment of Rs. 3.75 crores. Certain equipment have also been given on lease to HMPL for a period of eight years. The earning for Hukumchand on this ac-

count is Rs. 26.5 lakhs. Besides, HMPL has also taken over gratuity liabilities of Rs. 7.14 crores. The latter will result in a cash flow of Rs. 95 lakhs for Hukumchand by way of refund from the gratuity fund. The company also earned Rs. 60 lakhs through the sale of old machines.

Some of the funds generated through the deal is expected to be utilised to expand and diversify in the chemicals business. The company presently produces caustic soda, liquid chlorine hydrochloric acid and calcium hydrochlorite. During 1987-88, the company produced 51,120 tonnes of various chemicals and registered total sales of Rs. 15.92 crores. On the jute side, total production was 47,060 tonnes while sales stood at Rs. 39.81 crores. The company's total turnover from both the divisions was Rs. 55.74 crores against Rs. 53.06 crores registered in 1986-87.

KRIBHCO OFFERS TO SET UP FERTILISER PLANT IN S INDIA

The Krishak Bharati Cooperative Limited (Kribhco), proposes to set up a gas-based fertiliser plant in South India if sufficient gas is struck in the Cauvery or Krishna-Godavari basin,

Kribhco managing director K.K.S. Chauhan has said.

Addressing a press conference recently, Mr. Chauhan said a minimum of one million cubic feet of gas a day would be required to run a viable fertiliser plant.

Mr. Chauhan said Kribhco had made a net profit of over Rs. 100 crores during the fertiliser year 1987-88 (July to June).

GIDC TO BUILD INDUSTRIAL SHEDS

As many as 180 new factory sheds will be constructed during the current financial year by the Gujarat Industrial Development Corporation (GIDC) to accelerate the pace of industrial development in the state. For this purpose, a provision of Rs. 330.15 lakhs has been made. Besides, a sum of Rs. 181.63 lakhs will be spent on the construction of 72 factory sheds which have remained incomplete during 1987-88. A total provision of Rs. 511.83 lakhs has been made for the purpose.

An amount of Rs. 474.73 lakhs is estimated to be spent on the construction of these sheds in seven industrial estates. Of these, Rs. 139.46 lakhs will be spent in Umargan estate, Rs. 61.10 lakhs in Vapi, Rs. 51.32 lakhs in Panoli, Rs. 42.50 lakhs in Ankleshwar, Rs. 41.95 lakhs in Vaghodia, Rs. 85.67 lakhs in Sarigam and Rs. 52.78 lakhs in Chhatral.

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TIDCO, JK to make Penicillin-G

In a swift move, abandoning its earlier plan to team up with SPIC, Tamil Nadu Industrial Development Corporation, the State's principal promotional agency, has decided to go ahead with the Rs. 60-crore penicillin project in association with the JK group.

The corporation is forced to select a new partner in the wake of SPIC's reluctance to join hands with TIDCO and its desire to go it alone with the project.

After weighing offers from a couple of groups, TIDCO has opted for the JK group. While the corporation has a letter of intent, the JK group has a tie-up with Galonika of Yugoslavia for transferring the technology.

Both TIDCO and JK group have signed an agreement to promote the project in the joint sector. On obtaining the necessary clearances from the Government, it should be possible to commission the project within a period of 18 months.

The plant, being set up in Ambasamudram taluk of Tirunelveli district, will have a capacity to produce 1000 MMU of Penicillin-G (antibiotic) per annum. The estimated employment generation is 500.

The project cost is now revised upwards against the earlier estimate of Rs. 40 crores. Incidentally, the location of the project falls under the Tenkasi Parliamentary constituency of Mr. M. Arunachalam, Union Minister of State for Industrial Development.

If the project comes off, it will be a major boost to TIDCO for two reasons. In the first instance, it will have the pride of associating itself with a prestigious project manufacturing a vital drug. This is because, only TIDCO and its counterpart in West Bengal are the two State-level agencies holding Lis for such a project.

Secondly, it will give an opportunity for the corporation to team up with another leading industrial group. It has already promoted projects jointly with SPIC, Birlas, Tatas and Asian Paints.

It remains to be seen whether the latest development will come in the way of SPIC entering the line. The company appears to be upset over the "off and on" policy of the Government in this regard.

Its grievance is first the Government declaration that licences will go only to State-level promotional agencies. Then came the revised policy asking the entrepreneurs to put up an application for a composite licence so that allied products could be manufactured along with penicillin.

SPIC has acted accordingly and it also managed to bag the technology from a Portugal company. However, the Government, without issuing a composite licence, has given approvals for allied products other than penicillin.

SPIC is against promoting the project in the joint sector on two counts. It has already set up three major projects with TIDCO. Further, it is keen on converting it into a multi-product group.

TIDCO & SPIC DENY CLASH OF INTERESTS

There is no clash of interest between the state-owned Tamil Nadu Industrial Development Corporation (Tidco) and Spic in regard to their penicillin projects.

Mr. P. N. Vedanarayanan, chairman of Tidco and Mr. A. C. Muthiah, vice-chairman and president of Spic, said that from the beginning the two projects were proceeding on parallel lines and there was never any formal proposal that Tidco and Spic should combine and put up a plant in the joint sector. The question of Tidco ditching Spic or Spic backing out of a commitment did not therefore, arise, they said. "Spic was never involved in Tidco's project," Mr. Muthiah declared.

The two spokesmen reaffirmed that Tidco and Spic had an excellent relationship as partners in ongoing joint sector projects and this relationship would be further strengthened. They said they would be happy if Tamil Nadu had two penicillin projects.

Mr. Muthiah recalled that when the government opened up penicillin manufacture to new entrants, it decided that state-level industrial development corporations would be given letters of intent and private sector parties would be invited to submit composite applications for penicillin and allied products.

Accordingly, Tidco and the West Bengal Industrial Development Corporation obtained letters of intent. Spic, submitted a composite application for the manufacture of penicillin-G, Rifampicin, 6 APA and 7 ADCA. It has also signed a memorandum of understanding with Cipan of Portugal for technology transfer.

Mr. Muthiah said that Spic's application had recently been cleared by the secretariat of industrial approvals (SIA). The company would now take steps to implement its Rs. 60-crore project at the coastal town of Cuddalore.

He said that the Union minister of state for industrial development, Mr. M. Arunachalam, had informally suggested to him that Spic and Tidco should jointly put up a plant at Ambasamudram in southern Tamil Nadu.

REGISTRATION FOR DRUGS EXPORT TO US OBTAINED

The Basic Chemicals, Pharmaceuticals and Cosmetics Export Promotion Council (CHEMEXCIL) has obtained the registration for several companies for export of bulk drugs to the US.

These include Unichem Labs, Fairdeal Corporation, Cipla, G. Amphray Labs and Ortho-Pharma Private Ltd.

Fourteen more companies are at various stages of getting registration for export of their drugs. Once these companies also get their registration, exports of basic drugs to the US would pick up.

These are Bombay Drug House, Raptakos Brett and Company, Acharya Chemicals, Lyka Labs, Marvel Drugs, Plant Organics, Standard Organics, Cadila Lab, Transchem, Ranbaxy, Unique Pharmaceuticals, Gujarat Lyka Organics, Cheminor Drugs and Lupin.

Registration formalities are quite expensive and time consuming and involve lengthy procedures, compilation of extensive data and opening of drug master file. There is good potential for export of bulk drugs from India to the US, which has to import these because of pollution control regulations, economies of scale and other constraints.

All drugs meant for export to the US are required to be registered with the US Food and Drugs Administration.

5 drug combinations banned

The government has decided to ban the sale of five widely used fixed dose combinations of drugs, it is learnt. These combinations are found to have harmful side effects but are being marketed by many companies throughout the country.

The fixed dose combinations are: 1. Fixed dose combinations of tranquillisers with analgesics and antipyretics, 2. Fixed dose combinations of cyrazinamide and other anti-tuberculosis drugs, 3. Fixed dose combinations of essential oils with alcohol with higher than 20 per cent proof, 4. Fixed dose combinations of antiulcer drugs (cimetidine, ranitidine, etc) with other drugs and 5. Fixed dose combinations of chloroform with other drugs.

According to informed sources the proposed ban of these combinations would mean that the drug units will have to withdraw many of their established products from the market and reformulate them.

The ban on the fixed dose combinations of chloroform with other drugs will require withdrawal of a number of established brands of cough syrups of companies like Parke Davis, Alembic, Boehringer Knoll, Sarabhai's, Merck, Indian Drugs and Pharmaceuticals Ltd etc. from the market.

Although there are about 200 brands of cough syrups marketed in the country, only a dozen are well known brands. Most of these preparations contain chloroform ranging from 0.015 ml per five ml to 0.27 ml per five ml.

The sources said that the reason for the proposed ban on the use of chloroform in cough syrups is its carcinogenic effect on patients. Many drug companies abroad stopped using chloroform in cough syrups several years ago.

Drug companies are also marketing a number of formulations of analgesics with tranquillisers currently. Diazepam is the largely used tranquilliser in most of these preparations. Ranbaxy and Wockhardt, two large Indian drug companies have already reformulated their analgesic preparations now without diazepam.

The fixed dose combinations of anti-ulcer drugs such as cimetidine, ranitidine etc. with other drugs are not however marketed on a large scale in

the country at present. The same is the case with the formulations based on other two fixed dose combinations.

AMPICILLIN, AMOXYCILLIN PRICES REVISED

The government has revised the prices of two bulk drugs namely ampicillin and amoxycillin by over 12 per cent with immediate effect, it is learnt.

The price of ampicillin trihydrate is raised to Rs. 2054 per kg from the level of Rs. 1859. The price of this drug was revised last in March 1986.

The new price of ampicillin anhydrous, another salt, is fixed at Rs. 27-90 per kg. The earlier price of the drug was Rs. 2107 per kg. This price was fixed as early as September 1983.

In the case of amoxycillin trihydrate, the government has raised the price to Rs. 2855 per kg from the level of Rs. 2495. The last revision of the drug was in March 1985.

The government has not however revised the prices of formulations based on both these antibiotics, informed sources.

The government has so far revised the prices of about 25 bulk drugs under the Drug Price Control Order, 1987, although hundreds of applications for price revisions are still pending with the government.

SAFER ANTI-CANCER DRUG DEVELOPED

A safer and more effective anti-cancer drug is expected to be available in the country soon.

The drug, pharomarubicin, has been developed by an Italian multinational, Farmitalia Carlo Erba. Clinical studies show that the drug has been effective in treating breast cancer, malignant lymphomas, sarcomas, pancreas and stomach cancers.

A spokesman of the Bangalore based Dominion Chemical Industries, collaborators of the Italian firm, said in New Delhi that because of its high therapeutic activity, the drug ensures faster regression of tumours.

The drug which will soon be manufactured in this country will be priced at Rs. 200 per vial.

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PRICE CONTROL :

Drug co's oppose discrimination

The "discriminatory" approach adopted by the government in excluding certain drugs from price control is being strongly opposed by drug companies. A few companies have thus represented to the government to exclude some of their drugs also from price control.

The government has recently clarified that diphenhydramine HCL, a drug used in a fast selling cough syrup preparation, was excluded from price control on the "exclusion alternative" criteria of the Kelkar panel.

As per this criteria, all bulk drugs which are produced by at least five manufacturers and having 10 producers of formulations with no monopoly situation should be decontrolled.

It is considered that in such a situation the domestic production structure will be competitive and there would be little possibility that consumers would be over-charged.

This is one of the criteria adopted by the Kelkar committee for exclusion

from price control in the Category II of the Drug Price Control Order, 1987. Others are:

1. Exclude those drugs which are not produced in India, provided its consumption is not significant now or in the near future.

2. Exclude those drugs, the turnover of which have been less than Rs. 50 lakhs in 1986.

3. Exclude all new drugs for which process of manufacture were developed indigenously from price control for at least five years.

4. Exclude those life saving drugs and pharmaceutical products, the availability of which is far more important than the price. The nature of the demand is such that they are required less frequently, but its non-availability is fatal. The notable examples are sera and vaccines.

Informed sources said that if the government followed the exclusion cri-

teria for Category II drugs, a number of other drugs would also have to be decontrolled from the current list.

In fact there are quite a few bulk drugs listed in Category II which are being manufactured by five or more companies and also having more than 10 formulators. The government has not exempted these drugs from price control.

PANEL TO REVIEW SOME DRUGS UNDER DPCO

The Union health and family welfare ministry has constituted a committee to review the list of drugs which figure under category 1 of the Drugs Price Control Order, 1987.

The eight-member committee headed by Dr. H.H. Siddiqui, associate professor of pharmacology, All India Institute of Medical Sciences, will review the list of drugs included under category 1 of the Drugs Price Control Order 1987 and examine any other representation and suggestions for inclusion of essential drugs under this category.

The committee will give its report by the end of this month.

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RESEARCH & DEVELOPMENT

Organic compounds from biomass

Modern society relies on coal and oil, the main fossil sources of carbon, as feedstocks for synthesising organic chemicals vital to life. They are used in the production of materials such as polymers, plastics, fibres and pharmaceuticals. In the search for other, renewable sources attention has turned to plant crops. But, although nature has already synthesised many organic compounds similar to those resynthesised from oil, it is difficult to unlock them. Electrochemistry offers one route for the degradative conversions.

The discovery and production on a large scale of materials based on organic chemistry, which is the chemistry of carbon compounds, has had an obvious and profound impact on modern society. They include most polymers and plastics, paints, dyes, pharmaceuticals, detergents, man-made fibres, perfumes and fuels. The carbon source now used was originally fixed in plants by photosynthesis; on a geological time-scale, the carbon has been converted into oil and coal. It is these fossil fuels that are the feedstocks of today's organic chemicals industry.

At first organic chemical industries relied on wood, grains and oilseed crops as feedstocks. Until relatively recent times fermentation was the main source of ethyl alcohol (otherwise known as ethanol); in Brazil it remains so and contributes significantly to the economy as a replacement for imported petrol. The earliest soaps, detergents and dyes, together with such chemicals as glycerol, methanol, acetone, turpentine and acetic acid were all obtained from plant crops, now termed biomass.

Plant crop proved to be an unreliable starting material, for their quantity and quality depended upon weather, pests and disease. Eventually they were replaced, by chemistry first based on acetylene from coal and then on ethylene from oil.

Indigenous and economic routes to a great variety of organic compounds were devised as the science of organic chemistry developed. Many of the pro-

cesses depend on the use of catalysts, chemical reagents which greatly speed up otherwise sluggish reactions.

Depleting fossil sources

The oil crisis of the Seventies triggered a reappraisal. The world demand for organic chemicals is immense, amounting to hundreds of millions of tonnes every year. About 15 per cent of crude oil production is used for chemicals. The Earth's reserves of oil must eventually be exhausted, though opinions vary widely about when this will become critical. A large amount of coal remains to be used but it only postpones the problem and the economics of a coal-based organic chemical industry will certainly differ from those of the present oil-based one.

In contrast, biomass is a renewable resource. Modern methods of crop production and protection (thanks again to clever organic chemistry) ensure that the raw materials are cheaper and more reliable. The application of genetic engineering is producing crops that mature quickly and resist disease.

Within the biomass resource, forest trees are the largest renewable carbon source, sugarcane is also high on the list and is remarkable for being the most efficient device for the photosynthetic conversion of carbon dioxide into stored organic chemicals.

Wood, straw and bagasse (spent sugarcane) are the chief lignocellulosic materials available for conversion into useful organic chemicals. The organic chemist views a tree as potentially a very useful mixture of chemicals. Of these, the natural polymer cellulose is a fibre (such as in cotton) and it has little mechanical strength. The great strength of a tree derives from other natural polymers called lignins, which are not fibrous but cross-linked to give strength in three dimensions. In the tree it is bound to cellulose.

In the production of paper pulp the lignin and cellulose are separated, the cellulose component is used, and at present 75 per cent of the lignin residue is burned or discarded, sometimes as a polluting effluent. Some 30 mil-

lion tonnes of lignin are produced annually in this way. Yet lignins are polymers composed of derivatives of the most important aromatic hydrocarbon, benzene.

Coincidentally, the petrochemicals industry produces from other hydrocarbons roughly the amount of benzenoid compounds that is thrown away as lignin. These benzene derivatives are the building blocks for familiar materials that include polystyrene, polyester, plastic foams used in furniture upholstery, adhesives, detergents, paints and many others.

Degradation and electrochemistry

The ability of certain fungi and bacteria to rot wood has recently been shown to involve natural catalysts called oxidising enzymes. Removing electrons from lignins is also the way chemical oxidising reagents attack, but in the laboratory or chemical plant, concentrated reagents and temperatures in the region of 200°C are required compared with the modest temperatures and pressures at which nature does its chemistry.

Perhaps the most interesting feature is that reaction in both chemical and enzymic degradation is initiated by electron transfer. Electrochemistry has primarily to do with electron transfer and in recent years a great deal of fundamental chemical research, at the Queen Mary College in Britain, has been concerned with the mechanisms of electro-organic reactions.

At Queen Mary College, conditions for the efficient electrolytic breakdown of lignins have been worked out and successfully exploited in a specially designed prototype electrochemical reactor cell.

The results are highly encouraging. Already a variety of lignins derived from wood and straw have been oxidatively cleaved in the prototype electrochemical cells with an efficiency and selectivity somewhat greater than that of competing chemical techniques. The products are a narrow range of useful phenolic benzaldehydes, including vanillin. Their exact composition depends crucially on the source of the lignin starting material and the method used for its extraction. When scaled up, the technique will be environmentally more acceptable than existing ones. This is of great significance in an age when cleaner operation of chemical process is rightly demanded.

FASTER, POWERFUL SUPERCONDUCTIVE DEVICES

Toshiba Corp. has developed the technology to make superconductive devices much faster and more powerful than the silicon-based memory and logic chips now in use.

A Toshiba spokesman said that the company's research group had improved upon technology developed a year ago to create a superconductive film of yttrium, barium, copper and oxygen, bombarded with argon ions in a vacuum chamber and covered with a layer of silver to prevent deterioration of the film's surface.

The Toshiba technique was found to make possible creation of a 700-nanometre-thick, three-layer sandwich in which the centre layer is an insulator, surrounded by superconductive outer layers. Together they create a tunnel junction effect in which electrons are free to flow, virtually without resistance. The property of the materials is such that the flow of electrons is gradually shut off when current is applied

below a set level and suddenly resumes, when the current is increased above a set level, enabling use of the compound as an off-on switch.

The silver layer was also found to attain superconductive properties when used in the compound at minus 193°C.

Superconductors typically operate at extremely low temperatures in which the properties of materials are altered to offer no electrical resistance. The ability to manipulate the speed of electron movement predictably is the heart of semiconductor technology. Materials with superconductive properties, such as yttrium, niobium or gallium, are unstable, however, deteriorating when exposed to the air.

HYDROGEN TODAY

Hydrogen-based power engineering came into vogue in the wake of the oil crisis in the seventies. Scientists have been repeating that stocks of fossil-based fuel were limited in the earth and so alternative systems of energy supply should be tapped.

The seventh biennial World Conference on Hydrogen Power Engineering, "Hydrogen today", was held in Moscow on September 26 to 29. It was attended by more than 500 scientists from more than 20 countries. This is the first time that the forum is meeting in a socialist country.

The conference considered national and international programmes for hydrogen-based power engineering, advanced technologies of obtaining, storing, transporting and using hydrogen. The level attained is expected to help effectively tackle individual problems of power engineering, industry and transport. At the same time, it paves the way for more advanced and universal hydrogen schemes and devices.

Of great significance are renewable energy sources — solar, wind and geothermal energies, but they cannot solve global problems of power supply. They will be of local importance. The main line is to use such a powerful source as the nuclear energy of fission, and subsequently perhaps nuclear fusion. Safety and the minimum effect on the environment can be ensured.

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Vam Organic to set up Nitrocellulose unit

A Rs. 12-crore project is coming up in Moradabad district of Uttar Pradesh for the manufacture of nitrocellulose powder and nitrocellulose sheets.

Promoted by the Vam Organic Chemicals Limited, the plant will have a capacity of 2,000 MTPA nitrocellulose powder and 1,000 MTPA of nitrocellulose sheets.

The project cost will be met as follows: foreign exchange loan: Rs. 105 lakhs, term loans from banks/institutions; Rs. 405 lakhs, internal accruals Rs. 240 lakhs and debentures Rs. 405 lakhs.

The objection to the project by Asha Nitrocellulose Private Limited was overruled by the government in public interest.

Among reasons for the opposition was that there was no scope for creating further capacity in the manufacture of nitrocellulose powder as the total requirements of the product by 1991-92 would be around 1,400 MTPA whereas the present licensed capacity was of the order of 2649 MTPA.

The three existing units IEL, Punjab Cellulose and the Objector company—are stated to be achieving capacity utilisation only in the range of 50 per cent to 60 per cent.

It was pointed out that a further fall in demand for the powder was expected due to the shift to acrylic paints from nitrocellulose paints in the automobile industry.

The government in its order stated that the capacity of 1,000 MTPA of nitrocellulose powder by Vam Organic Chemicals was for captive consumption for the manufacture of nitrocellulose sheets.

It was also pointed out by the government that the present market was largely held by two manufacturers—one of them a Fera company (IEL)—operating "in a near monopolistic situation." Therefore the entry of one more unit will not only act as a countervailing force to IEL but would also ensure healthy competition in the product line.

The government order also stated that the demand by 1990-91 would be of 2,500 MTPA as against the present effective capacity of about

2,100 MTPA indicating there was scope for additional capacity.

LPA'S FILM ON FIRE CONTROL

Every year fires kill more than 20,000 people in industry and homes besides damaging property of over 100 crores of rupees.

Most fires start in a small way and because of ignorance or inattention to small details. However, if trained people and properly maintained equipment are available, the majority of these fires can be put out easily. Keeping this in view, the Loss Prevention Association of India Ltd. (LPA), a non-profit making body has produced a film 'Aag Ka Niyantran', which is in colour, lucid Hindi language and is of 21 minutes duration.

This film is an excellent aid to educate employees on the basic principles of fire prevention and control. This film depicts various types of extinguishers, their principles of working and operation and many other simple precautions for fire

safety. It is an ideal tool for training of employees/supervisors. For further details about this film, please contract:

Loss Prevention Association of India Ltd, Warden House, Sir P.M. Road, Bombay-400 001.

LAB: HIND. LEVER PLANS SEPARATE CO.

The Hindustan Lever Ltd., is possibly planning to set up a separate company for production of 60,000 tonnes of linear alkyl benzene (LAB). This is evident from a notice by the Legal Cell of the Government of India published in a section of the press recently.

According to this notification, the LAB project is expected to cost Rs. 112 crores (1985 prices). The foreign exchange components of this project is estimated to be Rs. 29 crores, equity Rs. 37 crores and debentures Rs. 75 crores, says the notification.

The company expects an annual turnover of Rs. 108 crores (1985 prices) from the sale of LAB. However, no location for the plant has been identified.

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New refinery for Gujarat likely

The question of location of an additional refinery in Gujarat is under consideration of the Central government. Data on requirements of petroleum products in the region is being assessed and the issue is to be finally decided by the Planning Commission by the end of this year.

This information was given by the Union minister of state for petroleum, Mr. Brahm Dutt when a delegation of the Gujarat Chamber of Commerce and Industry, led by its president, Mr. Naren Patel, met him in New Delhi recently.

As for supply of gas to industries and domestic consumers in Gujarat, the minister of state pointed out that necessary infrastructure will have to be prepared by the state government or concerned corporations for the purpose. The Planning Commission had also set up a working group for optimum utilisation of gas and this problem was being looked into.

Mr. Brahm Dutt pointed out that for major gas-based projects at Gandhar, the approval of the Planning Commission was necessary while uti-

lisation of gas from small fields located in isolated and remote pockets did not need this formality.

Regarding royalty on crude oil, he said the matter is under discussion with the concerned states and added that what is wanted is cheaper petroleum products. As for pricing of gas, he clarified that it should not be more than the cost of alternate fuels. He indicated that the gas price was likely to be revised in 1989.

He said on account of delay in the implementation of six fertiliser plants on the HBJ pipeline, gas has been given for power generation on fall-back basis for a period of three to five years only. Supply of gas for power is the primary consideration because it would reduce consumption of diesel and save foreign exchange.

On the demand for development of Rasayani type chemical complex in Gujarat he called for the preparation of a project report and submission of the same to the government for consideration. Bassein gas,

will be used after recoupment of sulphur from it, he said.

Mr. H.K. Khan, Union petroleum secretary, told the delegation that the question of developing Hajira as a chemical/terminal port in the joint sector with Gujarat Industrial Investment Corporation and other industrial houses is under active consideration. As for the Rasayani-type complex, he said this can be considered as there is considerable potential for exports.

HINDUSTAN CIBA GEIGY TO DISCONTINUE PHARMACEUTICAL RESEARCH

The board of directors of Hindustan Ciba Geigy decided in its meeting held on September 20 to discontinue the basic research part of its pharmaceutical activities. It will, however, continue its development for all the company's divisions including R and D work on dyes and adhesives.

The decision comes in the wake of the stand taken by the Ciba Geigy group (of which the Indian company is a subsidiary) to transfer the emphasis of its tropical medicine research from classical chemotherapy to prophylaxis with vaccines (including genetic engineering). Under its new research and development programme a vaccine against malaria is already reported to be at an advance stage of development.

According to Mr. M.K. Mong-Hensen, Managing Director, Hindustan Ciba-Geigy, work of this kind is not possible at its R and D centre at Goregaon in Bombay. At present no promising new compounds are also in the pipeline at this centre nor is there any prospect that a major product will become ready for the market within the next ten years. He also said that for employees, to whom no alternative position within the company can be offered, a social plan was being worked out.

The research centre in Bombay has been carrying out pharmaceutical research in addition to research activities of other kinds for the last 25 years. With this decision, the R and D related to pharmaceutical activities will not be undertaken at this centre any more.

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Berger Paints ties up with Holland firm

Berger Paints India Ltd has entered into a technical tie-up with Teodur NV, Holland, for the manufacture of a new range of powder paints.

Addressing newsmen after the company's annual general meeting held in Calcutta, on September 26, Mr. Vijay Mallya, Chairman, Berger Paints, said, that the range of new products is likely to hit the market by the middle of 1989.

Besides, the collaboration agreement with Teodur would enable the company to upgrade its processes, and cost-effectiveness in the manufacture of its existing product ranges, Mr. Mallya added.

Earlier, at the AGM, Mr. Mallya said the high outflow of foreign exchange of Rs. 2.5 crores was largely on account of import of raw material and technology, which enabled Berger to continue operations despite a dull business environment in the country.

However, efforts would be continued to boost exports and balance this outflow of foreign exchange, the chairman said.

Referring to the shareholders' criticism of large outstanding of Rs. 9.77 crores, Mr. Mallya said that this was because of the price rise announced by the company in July 1988. As revealed by the sale figure of June, the dealers had made a beeline to stock up before the price rise came into force. But, the company would initiate action to recover all outstanding soon, he added.

Despite an adverse industrial climate caused by the droughts when there had been a volume decline of about seven per cent in the paint industry, Berger had increased its sales value by 10 per cent over that of the previous year, the chairman said.

While a higher dividend of 20 per cent had been declared, the directors also recommended an issue of 1,362,282 paid-up bonus share in the proportion of one bonus share for every share held.

Besides to augment the longterm working capital needs of the company, a rights issue had also been cleared. The issue would be of 1,275,436 new ordinary equity shares of Rs. 10 each.

During the year, the company's foreign exchange earnings amounted to Rs. 0.63 crores against a foreign

exchange outflow of Rs. 2.5 crores.

Profits before tax for the year ended June 30, 1988, amounted to Rs. 2.10 crores as against Rs. 2.08 crores in the previous year. Profit after tax stood at Rs. 1.8 crores

Bharat Vijay Mill's bid to control Diamines

In the extra-ordinary general meeting of the Bharat Vijay Mills Ltd. held recently at Kalol, the shareholders have accorded their approval unanimously to the proposed investment of the company by way of purchase of 2,64,000 fully paid-up equity shares of Diamines and Chemicals Ltd. from Cellulose Products of India Ltd. at a purchase price of Rs. 35 per share, which is subject to the approval of the Central government, financial institutions, banks, stock exchanges, etc. By this, BVM has acquired a controlling interest of about 30 per cent in DACL, a high-earning company because of its profit potential and future diversification plans.

Mr. Bhupendra B. Patel, chairman of the meeting, also informed the shareholders that the company continued to do well in the current year. The total turnover upto August 31, 1988 reached Rs. 3852 lakhs, as compared to sales of Rs. 3244 lakhs for the corresponding period of last year, thus showing a rise by about 20 per cent.

Meanwhile, Diamines and Chemicals Ltd has reported encouraging results for the year ended June 30, 1988. The directors have recommended a higher gross dividend of 15 per cent on equity shares for 1987-88 against 12 per cent in the previous year. The gross profit has increased to Rs. 195.57 lakhs compared to Rs. 117.88 lakhs in the previous year. The company has achieved production of 1685 mt. against 1509 mt in the previous year registering 94 per cent capacity utilisation. The turnover of the company has increased to Rs. 12.24 crores as compared to Rs. 10.59 crores in the previous year, showing an increase of 16 per cent over the previous year.

According to Mr. N.C. Patel, managing director, the company has for the first time in India successfully exported 139 mt of its products to European countries including the Netherlands, Spain and Belgium.

compared to Rs. 1.90 crores in the previous year.

Sales registered an increase of ten per cent from Rs. 69.89 crores in 1987 to Rs. 77.13 crores. A sum of Rs. 0.42 crores was provided for depreciation.

The company has made much progress in modernisation-cum-expansion programmes which is expected to be completed in the current year. The company's project for manufacture of 150 mt per annum of piperazine and its salts is expected to be completed by the end of December 1988. The company is also taking necessary steps for finding out detailed feasibility for some of the downstream projects like manufacture of epoxy resins and rifampicin.

R. DUJODWALA AIMO CHIEF

Mr. Ramgopal Dujodwala has been elected President of All India Manufacturers' Organisation (AIMO).

Mr. Dujodwala, Chairman of Dujodwala Resins & Terpenes started his industry as a small-scale manufacturer, developed this to medium scale and eventually into a large-scale unit.

Mr. P.S. Kalani has been elected vice-president. Zonal Vice Presidents are Mr. D.D. Mehta (Bombay); Mr. M.M. Kela (Western region); Mr. Harbans Goel (Northern zone); Mr. S.V. Rai (Southern zone); and Mr. S.N. Rungta (Eastern zone).

Mr. Ashok Kadakia has been elected Hon. Treasurer; Mr. Babulal Todifi Hon. Gen. Secretary and Mr. Sudarshan Sareen and Mr. Raj Saraf have been elected Hon. Secretaries.

PANNA LALL MUNDHRA

Mr. Panna Lall Mundhra has been Elected President for the year 1988-89 of The Dyes and Chemical Merchants Association.

Mr. Mundhra was also the President of the Association during the year 1981-82.

He was also the president of Indian Chemicals Merchants & Manufacturers Association during the year 1976-77 & 1977-78.

Major shake-up at HFC proposed

The Hindustan Fertiliser Corporation (HFC) chief, Mr. Sebastian Jacob, has suggested to the Government a major administrative shake-up of the top echelons of all the three fertiliser plants under the umbrella of the corporation. He has proposed replacement of the existing general managers and deputy general managers and some other senior executives by recruiting more efficient ones from other public sector undertakings.

Mr. Jacob is opposed to shifting of the corporate headquarters from New Delhi to Calcutta, as suggested by the task force set up by the Government to probe into the state of affairs of the corporation-run plants and to recommend measures to improve it.

The HFC Chairman and Managing Director, however, is of the view that the corporation's marketing headquarters should be shifted from Calcutta to New Delhi. He has already written to the Government stating his views on these issues, according to sources in the Fertiliser Workers' Federation of India (FWFI).

Recently at a meeting of the executive body, FWFI discussed threadbare Mr. Jacob's views as reflected in the reported communication to the Government and expressed concern about some of his remarks, which the FWFI leaders feel would be damaging in view of the Government's intention to bring the corporation back on rails through revitalisation of all the running units for which massive investment of the order of around Rs. 1,200 crores would be required.

Defending his suggestion to inject senior executives from other Central organisations, Mr. Jacob reportedly said that the staff at the level of heads of departments (chief engineers level), deputy general managers and general managers are almost in the same age group of 50-55 years. This age group has taken the brunt of the problems these plants are constrained with. These executives never had the occasion to come across successful operations at their plants and the effect this has had on them has been almost devastating, the HFC chief feels.

These personnel, many of whom are well-qualified and competent, need reorientation which, he feels, is easier said than done. To tide

over the problem, he suggests changes at the top at the plant-level and that can be done only with the help of the Ministry concerned. Mr. Jacob suggests that services of personnel should be obtained from other industries at the level of general manager and deputy general manager for the units. The corporation would thus require about 15 people.

The HFC chief has stated in his communication to the Government, the FWFI sources point out, that the corporation does not have the capacity to mobilise so many experienced/qualified personnel for the simple reason that in the corporation's present condition, no one holding equivalent positions in successful companies would opt for HFC. Mr. Jacob also points out that gross indiscipline in all the HFC plants and industrial relations and social environment in areas where the plants are located are not congenial to improve the production. Despite this, one possible step which could improve the performance is strengthening of the management of units and marketing at its peak.

The biggest drawback of HFC today according to its chief, is that it remained almost all through its existence in the same manner as it is existing today. All its managers are accustomed only to: (1) Losses from the beginning and that too heavy, (2) Gross indiscipline on the part of the labour and junior officers, (3) Progressive loss in control and very seldom decisions could be taken objectively (4) Over the years, certain basic decisions which normally a good management should take have been taken more or less by the unions, resulting in great distortion in the functioning of the corporation.

The task force, during their visit to the plants, noticed that "officers are, by and large, lacking dedication and, in fact, among a majority of them, demoralisation, rather than degeneration has set in." There is a strong case to introduce certain steps to make them vigorous and dynamic. The task force further points out, "Of all persons left out of the incentive schemes are general managers and directors. There does not seem to be any rationale in this policy. They equally deserve incentives if the plants' performance improves."

Refuting the suggestion of the task force to shift the corporate headquarters from New Delhi to Calcutta, Mr. Jacob, according to FWFI sources, told the Government that the shifting would not be a wise step. It is certain that disadvantages of this move outweigh benefits, if any.

Commenting on the Durgapur plant the task force points out that the first and foremost thing to do is to revive the social climate and performance level of personnel. Though it appears to be a difficult task, unless the atmosphere is significantly improved, the kind of management and monetary inputs which is needed would be wasted as earlier short-term promises have failed time and again, the task force remarked.

According to Mr. Jacob, it is hard to find fault with this recommendation as they are based on facts. In the Durgapur plant, labour productivity is the lowest and discipline is almost non-existent with its difficult socio-political climate and intense interunion rivalry. The agencies providing support activities to maintain production also suffer from the same infirmities, contributing further to the distress of the corporation. Similar is the story of Barauni where the industrial atmosphere is not congenial and the management appears to be helpless in maintaining discipline, as reflected in the report of the task force.

Regarding Namrup, however, the HFC chief differs with the task force observation that with the settlement of the Assam agitation it should be possible to get competent personnel to run the plant. On account of its remote location and various other social problems, he points out it is difficult to get such personnel to go there. Other public sector companies give an Assam allowance and other benefits to induce people to go there. HFC has not succeeded in convincing the Ministry and the Bureau of Public Enterprises in this regard.

Referring to the marketing wing of the corporation, the task force points out that one of the undesirable effects of the reorganisation of the erstwhile Fertiliser Corporation of India, and the formation of its units into several companies was that HFC was left with an employee strength in certain departments which was far beyond their needs.

6 companies shortlisted for Shahjahanpur project

Six companies have been shortlisted for the gas-based Shahjahanpur fertiliser project. A final decision is expected within the next two weeks.

Among those shortlisted are the Krishak Bharati Co-operative Ltd. (Kribhco), the Rashtriya Chemicals and Fertilisers Ltd. (RCF) two private sector companies and two non-resident Indians.

One of the private companies shortlisted for the project, the letter of intent which was held till recently by the Caparo group of Mr. Swraj Paul, is the Oswal Agro group.

Among the non-resident Indians is Dr. B.K. Pande who is executive vice-president of the US-based Shakti International Resources Incorporated.

Of the two co-operative and public sector companies, Kribhco and RCF, the government seems more inclined towards Kribhco because of its sound financial position. The Kribhco management has told the government that it would be able to put up the plant from its internal resources and without any budgetary support.

The government is aware that in the case of RCF the company would need adequate budgetary support to execute the project.

Kribhco's financial position can be gauged from the fact that it paid dividends amounting to Rs. 13.84 crores for 1986-87 to its member-co-operatives, including Rs. 10.32 crores to the Union government.

The society has also paid in advance to the government Rs. 90 crores and has liquidated the entire loan amount of Rs. 79.7 crores drawn from the Industrial Development Bank of India (IDBI) and other financial institutions within three years of the commencement of the commercial production.

Kribhco is already executing an ammonia extension project in Hazira with an estimated cost of Rs. 223 crores. The zero date of the project is August 11, 1989, and the completion date is November 1, 1990. The project is reported to be several months ahead of schedule.

Both the Indian fertiliser co-operatives in the country, Indian Farmers Fertiliser Co-operative (Iffco) and Kribhco had applied to the government. But instead of giving the

Shahjahanpur project to Iffco the government allowed it to double the capacity of its gas-based fertiliser unit at Aonla.

Iffco will, thus, instal an additional 1,350 tonnes a day capacity ammonia unit and two additional urea units, each with a capacity of 1,100 tpd, at its Aonla complex. The expansion project is expected to cost Rs. 550 crores against an investment of Rs. 700 to Rs. 800 crores for setting up an identical plant at a greenfield site such as Shahjahanpur.

Kribhco has been pressing for its claim ever since the government allowed Iffco to double its capacity at Aonla. Some officials are of the view that Kribhco's claim for Shahjahanpur is justified in view of its past performance.

Oswal Agro has also staked its claim to the project on the basis of its financial strength. Its annual turnover for 1987 was Rs. 200 crores

and is projected to exceed Rs. 380 crores in 1988 and Rs. 508 crores in 1989. Based on the current market price the net growth of the group companies stands at Rs. 300 crores.

According to the application submitted by the group, it has surplus funds to the extent of Rs. 100 crores which can be gainfully utilised.

In its application for the letter of intent, Dr. Pande has offered to meet the entire foreign exchange requirement of the project. He has also offered to arrange all the funds required for his share of the equity.

SHELLAC EXPORT NORMS CHANGED

The Commerce Ministry has made the Calcutta-based Shellac Export Promotion Council the registering authority for export of lac in all its forms.

Earlier, Shellac Export Promotion Council was the registering authority for dewaxed decoloured shellac only. The amendment in the items description has been made through a notification.

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5% cut in freight subsidy stays

The government has announced the final equated freight rates for 1987-88 for nitrogenous and complex fertilisers which may seriously erode the profitability of fertiliser companies.

By the government's own admission, the rates are five per cent less than what it considers reasonable.

The final rates have come as a surprise to the industry as these are the same as the provisional equated freight announced in January 1988 and do not restore the cut of five per cent imposed on the freight considered reasonable by the government itself.

There was a 20 per cent increase in railway freight from December 1, 1986. However, until January 1988 no correction was made in the equated freight and the freight subsidy. Only provisional rates were announced for 1987-88 leaving a period of four months — December 1, 1986 to March 31, 1987 — uncovered.

Even in announcing the provisional freight after such a long delay, the rates announced were not only below the actual incidence during 1986-87 as claimed by the manufacturers but also an "arbitrary cut" of five per cent over the rates computed as reasonable by the fertiliser industry co-ordination committee (FICC), was imposed.

The industry has been representing to the government that the cut would seriously erode its profitability and has been demanding corrective action. In conforming the provisional rates as final freight for 1987-88, the industry says that the nitrogenous and complex fertilisers would suffer a total loss of about Rs. 19 crores.

In respect of the four-month period — December 1986 to March 1987 — the government has announced enhancement to the equated freight after nearly 21 months. Though the amount involved in this — Rs. 15 crores — will now be reimbursed, the industry would still incur a loss of interest of about Rs. 3.5 crores on the delayed payment.

Industry circles say that though the government has been claiming that there is no change in its policy of allowing 12 per cent post-tax return on net worth of the manufacturers, it has been denying various legitimate dues to the industry in its anxiety to reduce subsidy on fertilisers. The delayed revision of freight as also the cut of five per cent would erode this return.

Industry sources say that there are many other examples of this. For instance, in fixing the retention price, cost of 50 kg bags is taken into account. However, in June

1988 the government directed all urea and DAP manufacturers to supply the fertiliser to the extent of 10 per cent of their total allocation in 25 kg bags in the districts to be intimated by state governments.

Packing fertilisers in smaller bags results in an additional cost of Rs. 60 a tonne. On 10 per cent of the anticipated urea and DAP production, the additional cost would be nearly Rs. 8.5 crores which, as per the government order, has to be borne by the industry eroding its profitability.

The sources say that this decision is contrary to what was proposed in the agenda papers and approved by the chief minister's conference on special foodgrain production programme in March 1988. It was stipulated in the document that the additional cost of packing fertiliser in smaller packs would be passed on to the consumer.

The sources say that another area which has resulted in considerable erosion of the profitability is the inventory carrying cost. For the past three years the industry has been carrying significantly high levels of inventory over what has been allowed in the retention price mechanism because of the glut in the market. The sources say that the glut situation had rendered the norms fixed for pricing totally irrelevant.

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ADVERTISERS VISITING SOUTH IN THE MIDDLE OF OCTOBER '88

IPCL offers crates for packaging

The Department of Chemicals and Petrochemicals plans to introduce 20,000 plastic crates in Himachal Pradesh and 2,000 in Jammu and Kashmir during the current apple season.

Next year, another 20,000 crates will be given.

A target of one million crates has been set for the 1990 apple season according to official sources.

With a view to increasing productivity in agriculture by better conservation of water resources and efficient utilisation of available water in drought-prone areas, the department has evolved a package for the use of plastics, sources said.

The package broadly consists of packaging of fruits, vegetables and other agricultural produce, drip irrigation, canal pond lining, plastic pipes for water distribution, green houses and nursery bags for afforestation programme.

Indian Petrochemical Corporation Ltd (IPCL) will offer the 22,000 crates free of charge to Himachal Pradesh and Jammu and Kashmir during the current apple season.

While funds for the programme would come through normal plan schemes, IPCL would provide assistance for promotional efforts such as propagation of green houses and plastic crates, sources said.

The action plan drawn up by the department for plasticulture includes adoption of 15 districts in various agro-climatic zones in the country which will be known as plasticulture districts.

Greater attention will be paid to drip irrigation in these districts because this system offers the potential to improve water conservation by 30 to 50 per cent and increase agriculture productivity in the same proportion.

IPCL has evolved a prototype of a simple and cheap green house which has been tried successfully in Baroda.

Pond-lining is another important area as lining of ponds in arid and semi-arid areas has proved successful, sources said.

Official sources said in addition to plasticulture districts, a special project will be taken up in areas of Kalahandi and Koraput blocks of Orissa by the department through IPCL. This programme will include providing amenities to the poor section of these areas in the form of

PVC utensils, footwear and shelter.

Employment generation schemes based on the use of synthetic fibres for spinning, weaving, making of rope and twine and nursery bags would be promoted.

As regards canal lining, use of LD-PE in some States has been successful, sources said.

As for packaging, the Department of Chemicals and Petrochemicals has been stressing the use of plastic crates for fruit packaging in view of the benefits in conserving trees in providing superior packaging material and in the economies that this offers with their longer usage, sources said.

Sources said the department will also interact with the Department of Food Processing to ensure greater use of plastics for packaging of processed products to ensure longer shelf-life and lower cost.

'PLASTIC EXPORTERS MUST SHUN COMPLACENCY'

Mr. Priya Ranjan Dasmunshi Union minister of state for commerce has asked exporters of plastic goods to shake off the complacency of protected markets.

It has been seen that dependence on a single market spells utter ruin for any product as has been in respect of spectacle-frames. Plastics products have tremendous potential for export to the Middle East, most of Europe and some African countries Mr. Dasmunshi said.

The minister, who was speaking on the occasion of the awards distribution function of The Plastics and Linoleum Export Promotion Council for 1985-86 and 1986-87 in Bombay on September 22, pointed out that though the problem of export realisation from African countries remained, yet the industry could always find a mechanism for export penetration as exports should be made against letters of credit. He has advised the industry to constantly update its technology and cope with rapidly changing demands in overseas markets to retain its competition age.

Earlier, in his welcome address, Mr. D.K. Shah, chairman, reception committee, said that from a nominal export figure of Rs. 7.55 lakhs in 1955-56, exports had multiplied and for 1987-88, the figure stood at Rs.

64 crores. He opined that continuous exports would result in product development expansion of production capacity, modern packaging techniques and create an image for India in the international market.

Mr. V. V. Parekh, PLEXCONCIL chairman, pointed out that during the current year the council has been allotted a target of Rs. 130 crores. The performance during April-July, 1988 amounts to Rs. 28 crores and the council feels that with this trend, it will not be difficult to achieve this target. Mr. Parekh offered several suggestions to achieve this target.

NEED TO STOP VALUE-ADDED ITEMS' IMPORT

Prof. C.N.R. Rao, Chairman of the Prime Minister's Science Advisory Council, called for a change in the country's export-import strategies.

Inaugurating a national symposium on 'recent advances in drug research' in Hosur he wanted an end to the import of value-added products and the export of raw materials.

Citing examples, he said though Karnataka was rich in iron ore deposits, iron oxide was not made indigenously but imported. Similarly, alumina or aluminium oxide, required by the electronic industry, was also being imported.

Prof. Rao said the country should concentrate on industries and improve exports of chemicals, pharmaceuticals, computer software and consumer products in the coming years.

'We must achieve Rs. 100,000 crores in exports in the next few years. This is not a big figure. Our exports this year stand at Rs. 18,700 crores', he added.

Prof. Rao regretted that investment by the industry in research and development was almost zero with most of the funding being done by the Government. The industry must make investments on futuristic projects for worth-while spinoffs, he added.

He was also critical about Indian scientists 'ducking' difficult and challenging problems in research. 'We must do competitive research to catch up with the rest of the world. We have to be competitive in science if not in technology', he added.

Canadian firms keen on tie-ups in plastics sector

The Canadian plastics industry is keen on establishing joint ventures with Indian companies along with export arrangements. The main areas of interest are engineering plastics, packaging, consumer products and construction.

An eight-member delegation of top Canadian companies, comprising plastics raw material producers, processors, dies and tool manufacturers as well as equipment designers, was in the country to study the avenues for collaboration and for discussions with the Indian counterparts.

At a meeting with the members of the Confederation of Engineering Industry (CEI), the President of the Society of Plastics Industry in Canada, Mr. On Evason, said that this was the first-ever trade mission organised by the Government of Ontario, Canada. The Canadian companies, he said, were very hopeful of setting up joint ventures in India in the four sectors which were seen as the main opportunity areas.

The largest consumers of plastics in Canada, he said, were the pack-

aging industry (33 per cent), construction (25 per cent) and the automotive sector (10 per cent).

Mr. Shamsheer Singh, Senior Consultant, South Asia section, Ontario, who led the delegation, sought clarity on the Union Government's policies regarding joint venture collaboration, licensing and investment. Apart from discussions on one-to-one business, Mr. Singh also urged the CEI members to throw light on the Indian industry's own perspective on the plastics industry.

Addressing the meeting, Mr. M.P. Singh Industrial Adviser, Directorate General of Technical Development (DGTD), said that though the industry in India was still in its infancy, engineering plastics has logged a 14 per cent growth rate and was fast replacing conventional materials. With applications still limited, they were being extensively used in the electronics industry. Consumption of plastics in the automotive sector was also on the increase as large volume usage in a product made the item cost-effective.

Plastics consumption in India, Mr.

Singh said, was a mere 18,000 tonnes against a global utilisation of about six million tonnes. A 'sunrise industry', the Government had granted it a number of concessions and policy relaxations along with other hi-tech areas. However, Mr. Singh cautioned the delegation about the safety standards and environmental safeguards that had to be kept in mind by the industry.

Earlier, welcoming the team, Mr. Pran Talwar, CEI Chairman Northern Region, said it was estimated that by the year 2000 AD, plastics consumption in India would increase three-fold — from 0.5 million tonnes to 1.5 million tonnes. An officially constituted technology development advisory group for plastics has identified three thrust sectors within the industry, namely, commodity plastics synthetic fibres and engineering plastics. Engineering plastics, he said, would shift from the current scenario of incremental growth to 'mega growth in mega markets', mainly in areas of packaging, transportation, building and construction.

PLASTIC EXPORTERS MAY GET POLYMERS AT GLOBAL PRICES

Domestic manufacturers of polymers, namely, Indian Petrochemicals Corporation Limited, National Organic Chemicals Limited, Polyolefin Industries Limited have agreed to set aside about 10 per cent of their output for making it available to Indian processors at international prices with a view to enabling the latter to boost the exports of plastic products.

This offer by the three companies is, however, subject to the condition that domestic inputs such as naphtha, furnace oil, etc, be made available to them at the agreed international prices. The Plastics and Linoleums Export Promotional Council (PLEX-CONCIL) is persuading the government that raw materials like the naphtha be made available at the international prices.

In a separate exercise, these raw material manufacturers have already furnished the input-output norms to the DGTD for the purpose of calculating norms of conversion when naphtha is bought at international prices.

According to chairman of the council Vaman Parekh India could export goods worth more than Rs. 400 crores in the next two or three years, against the target of Rs. 130 crores

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Standards on effluents questioned

The Minimal National Standards (MINAS), considered to be the minimum standard that a specific industry should achieve in its effluent treatment, should be reviewed to make it more "realistic", Dr. Deepak Kantawala of the environmental engineering consultants, said in Bombay.

At the symposium on water pollution held in Bombay in connection with the on-going international conference on industrial pollution control and safety, he said MINAS have become the maximum achievable standards in many cases, as in the oil refinery, the pesticide and the distillery industry. It was necessary that the applicable standards be practical he said.

Questioning the necessity of MINAS, Dr. Kantawala said these standards were not disposal specific. "If the ultimate disposal of the effluent is in marine or estuarine waters, the standards have no relevance," Dr. Kantawala felt.

Dr. Kantawala said many of the standards failed in implementability and enforceability as they were too stringent. "It is also essential that for a parameter like biological oxygen demand (BOD) where the standard deviation in analytical result itself is high, a range should be specified," he added.

In a paper on the effects of water-borne and air-borne pollutants on health, Dr. A.K. Susheela, assistant professor, All-India Institute of Medical Sciences, Delhi, stressed the importance of monitoring the health of workers exposed to chemical pollutants.

Dr. Susheela pointed out that industrial establishments were responsible for the health of their workers and said a system of cataloguing the pollutants released by an industry should be evolved.

Managements should assess the magnitude of the pollutants in air and water, she said. The workers should also be provided with a handbook containing details of health hazards likely to result from handling a particular chemical pollutant, she emphasised.

Focussing her talk on the impact of fluoride pollution, Dr. Susheela said in India drinking water, food, drugs and cosmetics were heavily contaminated with fluorides.

She felt the Western standard of

maximum permissible level of fluoride in the human body of 1.5 parts per million (ppm) was not practical in India where it should be reduced to 1 ppm, she said.

Fluorides, when ingested or inhaled in excess, could induce ageing, and cause skeletal fluorosis, dental fluorosis, non-skeletal manifestations or a combination of all the above, Dr. Susheela said.

Dr. Susheela suggested that a thorough health check-up of the worker at the time of recruitment be done as many people had already ingested the pollutant from other sources before starting work.

A health education programme, emphasising the importance of adequate daily intake of calcium, vitamin C and a balanced diet, should be provided to the workers, she said.

She also recommended the use of masks by workers, annual health checkups and transfer of workers from high to low or no fluoride areas once in five years.

The symposium was inaugurated by the state minister for health and medical education, Mr. J. Darda.

TASK FORCE TO STUDY PROBLEMS OF SSIS

The Government has set up a task force to examine the problems of the small-scale industries in the country.

The task force, which will be headed by Mr. G.S. Dahotra, Chairman, Dena Bank, will suggest measures to overcome the small-scale units' difficulties in obtaining timely credit from commercial banks and improving the general industrial climate in the country.

Giving this information the Union Minister of State for Finance, Mr. Eduardo Faleiro, said that the Government is determined to see that commercial banks take a positive view of viable plans in the small-scale sector.

Talking to some young entrepreneurs, the Minister said that banks will have to eliminate undue delays in disposing of loan applications of entrepreneurs by carrying out necessary delegation of powers in the system.

Mr. Faleiro said that guidelines have already been issued to commercial banks requiring branch

managers to use their discretionary powers while sanctioning loans. A definite date for discussion and consideration of the proposal has also to be fixed after it is submitted to the bank.

Applications for credit up to Rs. 25,000 have to be disposed of within a fortnight and those for amounts above Rs. 25,000 within nine weeks.

The Minister said that keeping in view inflationary and other factors, it has been decided to review the working capital limits periodically and wherever justified, limits will be enhanced. The accounts will be reviewed annually.

The banks have been advised to adopt a flexible and realistic approach in sanctioning the working limits. The decision on increasing the limits will be communicated within six weeks from the date of submission of the proposals, he said.

Banks have also been advised to sanction full working capital related to needs at the beginning itself. Besides, the contingency provision of 10 per cent related to unforeseen bottlenecks will also be added to the working capital Mr. Faleiro said.

TN CEILING RAISED

The investment threshold for projects requiring clearance by the Tamil Nadu State Environmental Committee has been raised to Rs. 5 crores from the existing level of Rs. 50 lakhs.

Announcing this "liberalisation" of environmental clearance, in pursuance of the first package of incentives for the benefit of trade and industry, the State Government said in a press release in Madras that exemption from such clearance will be given, irrespective of the investment portfolio, to all "unit which are not likely to have any type of pollution problem."

As a measure of "liberalisation" in another direction, the Government also announced that even in respect of projects requiring environmental clearance under the new-revised norms, the State-level Committee on Industries could dispose of several environmental clearances in its own discretion. The Environmental Committee will take cognisance of only those cases which the Committee on Industries will forward for higher clearance.

Decision soon on oil refinery

The prospects of setting up an oil refinery in Tamil Nadu have increased with substantial finds of oil in the onland and offshore areas of the Cauvery basin. It would be decided in two months whether it should be a big or mini-refinery, said Mr. S. Venkataraman, Deputy General Manager (Geology), Oil and Natural Gas Commission, Madras. The ideal location would be Seerkazhi or Mayiladuthurai in Thanjavur district.

At a workshop on "Natural gas availability — prospects for industries in Tamil Nadu", organised by the Confederation of Engineering Industry Southern region. Mr. Venkataraman said that two months ago the idea was to set up a mini refinery but today after the big oil-find in the offshore well, PY-3-2, off Porto Novo (more than 4,000 barrels a day), "we are seeing whether we can have a major refinery and we will decide in two months", he said. The Madras Refineries was showing interest in the new refinery's construction.

The ONGC was also looking into the possibility of integrating the offshore and onland finds in the Cauvery basin towards setting up the refinery. It was studying the possibility of switching over to transport of crude oil by rail-tankers from the Narimanam, Kovilkalappal and Bhuvanagiri finds. Now, the

crude was being transported by road to the Madras Refineries for processing. The production of crude from the onland wells in the Cauvery basin would touch 1,000 tonnes a day in about a year and 1,350 tonnes by the end of the Seventh Plan period.

Future plans: Outlining the future plans of the ONGC in the Cauvery basin, Mr. Venkataraman said the Kovilkalappal area and the Nagapattinam sub-basin would be developed in a big way. The Pondichery offshore area was also prospective. By the end of the Seventh Plan, it would drill again in the Gulf of Mannar and analyse the data. More exploratory wells would be drilled in the PY-1 offshore structure, where the PY-18 well recently produced 3.8 lakh cubic metres of free gas. This well would be fully developed during the Eighth Plan period if the finds were commercially viable.

The ONGC would resume drilling in the Palk Bay and would also prospect for oil and gas in the Ramnad sub-basin. The number of onland rigs would be increased to 11 and drilling ships to five at the end of the Eighth Plan from the present six and two respectively. "By the last year of the Eighth Plan, we hope to produce 2.5 million tonnes of oil a year and 1 to 2.5 million cubic metres of gas a day from the Cauvery basin", Mr. Venkataraman said.

Mr. K. Anantaramaiah, Deputy Superintending Geologist, ONGC said natural gas could be used as feedstock for fertilizer industries, in LPG production, power generation, as fuel in small industries, in the manufacture of petrochemicals etc. The production potential of gas in cubic metres a day by April, 1990 would be 2,35,000 in Narimanam, 45,000 in Kovilkalappal, 80,000 in Nannilam and 4,75,000 in Bhuvanagiri. In the Cauvery offshore area, the production potential in cubic metres a day by 1990 from PY-3 structure would be 2,54,000 (associated gas). From the PY-1 structure, it would be one million cubic metres a day of free gas. Mr. P. Ilangoan, marketing officer ONGC said that at present 4,000 cubic metres of gas a day was supplied from Narimanam to the Indian Steel Rolling Mills at Nagapattinam and supply of another 10,000 cubic metres of gas to two sodium silicate plants would commence in October/November, 1988. The ONGC would also supply 40,000 cubic metres of gas a day to the TNEB to produce five MW of electricity at Kovilkalappal, Mr. Ilangoan said.

Mr. U.C. Ray, Deputy General Manager (production), ONGC said natural gas had good potential as alternative fuel and its exploitation would lead to industrial development.

Mr. P. Jayakumar, Convenor, energy panel, CEI Tamil Nadu, welcomed the gathering.

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New burner developed to save furnace oil

Scientists have developed a special burner which uses sound waves for better combustion, effecting saving of precious furnace oil in chemical and metallurgical industries.

The burner developed at the Regional Research Laboratory (RRL), a unit of the Council of Scientific and Industrial Research (CSIR), uses acoustic energy for atomising liquid fuel for combustion.

The burner consists of a resonator that generates acoustic waves when compressed air is passed through a special nozzle, says Dr. K.M. Swamy of RRL who along with fellow scientists Dr. K.L. Narayana and Dr. J.S. Murty, worked on the project.

The liquid fuel is fed to the 'sonic area' where it gets atomised into fine droplets which burn better than in a conventional burner.

These droplets produced by acoustic atomisation are smaller than those in conventional burner and relatively uniform in size.

When enveloped with compressed air, the droplets burn with a steady flame as soon as the burner is lighted, cutting down fuel consumption, producing less pollutants and leaving no soot formation.

'Our studies during trials have shown that fuel saving up to 15 per cent is possible as it burns heavy fuel oil with less amount of excess air' Dr. Swamy says.

The scientists say the burner operates efficiently even with fuel oil having moisture content of 20 per cent and is less sensitive to variation in pre-heating temperatures of oil.

It can replace a wide variety of burners like the centrifugal and the high pressure air atomised burners that use high viscosity fuel oils.

The acoustic burner has undergone field trials in tunnel kilns, rotary kilns and anode furnaces.

The first prototype of 30 litres per hour capacity (LPH) was tested at RRL. A burner of 100 LPH capacity was tried in an anode furnace for melting copper at the Hindustan Copper Ltd's unit at Ghatsila.

Later, a higher capacity burner of 500 LPH was tested in a new cold rolling mill boiler at the Rourkela steel plant.

RRL scientists say that impressed with the burner's performance, the Steel Authority of India Tata Steel and the Hindustan Copper have decided to instal it in their units.

The three scientists were jointly awarded by the National Research Development Corporation (NRDC) for developing the burner.

The scientists say that with the cost of furnace oil shooting up three-fold, affecting production cost in several chemical and metallurgical units, there is an awareness the world over to conserve fuel oil by different means.

The scientists thought that one way to conserve fuel was to improve the existing liquid fuel burner for efficient and better consumption.

Dr. K.L. Narayana says they worked on the acoustic burner as any improvement in combustion should begin with better atomisation of fuel.

Earlier, attempts to develop burners in the US and Britain failed as their burners needed high intensity acoustic energy, consumed a lot of power and suffered the disadvantage of lower operating temperature (less than 204 degree celsius), the scientists' say.

BIOTECHNOLOGY RESEARCH

Australia's Industry and Development Board has offered grants worth \$3.5 millions for precompetitive strategic research in biotechnology. The grants for seven biotechnology projects would be provided to cover work during the three calendar years 1988-90.

The grants are made available under the generic-technology component of the Grants for Industry Research and Development (GIRD) scheme. They are second in the biotechnology generic-technology category to be offered under GIRD, which began on July 1. Generic technology grants are designed to support precompetitive research, particularly new or emerging technologies considered strategic to Australia's future competitiveness.

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IOC awaits approval for 8 projects

The Indian Oil Corporation (IOC) is awaiting Government approval for eight of its projects valued at Rs. 1,156.43 crores, Mr. S.L. Khosla, Chairman of IOC said.

These projects, Mr. Khosla said, would be completed within four years of clearance. The projects posed to the Government include the Kandla-Bhatinda and Haldia-Budge Budge, product pipelines. On the basis of a demand study of the eastern region, a proposal is also being formulated for another six million tonnes grassroots refinery in the area. The thrust is on planning for meeting projected consumer requirements, Mr. Khosla added.

Indian Oil, Mr. Khosla said, has in hand projects valued at over Rs. 1,000 crores. These are likely to be completed within the next two years with the exception of the hydro-cracker at Gujarat, and the Chaksu-Karnal pipeline which may take another two to three years.

Mr. Khosla said, Indian Oil has taken a lead in updating technology for secondary processing facilities at refineries. For installation of hydro-cracker at Gujarat refinery collaboration agreement has been entered into with Chevron of the US for technology and design. Work on off-site facilities is under progress. This Rs. 635-crores project is scheduled for completion in 1992.

The capacity of the Gujarat refinery, Mr. Khosla said, has already been increased by 0.8 million tonnes and would further be augmented by 1.4 million tonnes before the end of this year. The Gujarat refinery, he added, would then have a processing capacity of 9.5 million tonnes per annum. The capacity expansion of Mathura refinery, from six to 7.5 million tonnes per annum has just been completed.

By the end of this year, Mr. Khosla said, the modification of Salaya-Mathura pipeline to enable pumping of Bombay High crude in unlimited parcel size during winter would also be completed.

To improve the quality of motor spirit produced at Barauni and Digboi refineries, Indian Oil propose to set up catalytic reforming units at both refineries. These projects would be completed within 42 months of approval. A detailed feasibility report has also been submitted to the Government for setting up a 1331 km. product pipeline from Kandla to Bhatinda at a cost of Rs. 686.54 crores.

The pipeline which is expected to meet the product requirements of north and north-west regions, Mr. Khosla said would be completed within 33 months of approval. It is proposed to accomplish along with this project a hook-up of Karnal with the Mathura-Jalandhar pipeline. The Kandla-Bhatinda pipeline will have tap-off points at Sidhpur, Jodhpur, Jaipur, Rewari, Karnal, Sangrur and Bhatinda. Jodhpur will be connected to the main line through a branch line.

To meet the requirements of Greater Calcutta, Mr. Khosla said a product pipeline is also proposed from Haldia to Budge Budge. A second SBM (single buoy mooring) has also been proposed at Salaya to facilitate augmentation of crude supplies to Mathura and the proposed Karnal refinery. There are also plans, he added, for separation of propylene at Mathura and modernisation of the Digboi refinery. Propylene is a building block for various petrochemicals.

Indian Oil, Mr. Khosla added, has also undertaken an internal study to examine the feasibility of production of primary and intermediate petrochemicals, consistent with the quality of feedstock available in our refineries. These, he said, could be supplied to downstream units. The production potential of petroleum speciality products is also being studied.

Talking about the performance and productivity of IOC, Mr. Khosla said its refineries achieved over 100 per cent capacity utilisation even after an increase in rated capacity. Product sales crossed 27 million tonnes and the profit earned during 1987-88 was the highest during any one year. The Corporation's turnover increased by nearly Rs. 1,500 crores to Rs. 14,406.54 crores, a growth of 11.6 per cent over the previous year.

The sales per employee during 1987-88, Mr. Khosla said had gone up to 2255 tonnes as compared to 2121 tonnes in the previous year. Refinery capacity per employee had gone up to 2,539 tonnes as compared to 2,480 tonnes in the previous year. These are measures of higher productivity, he added.

Commenting on operating efficiency, Mr. Khosla said, the Corporation had not only increased the installed refining capacity from 20.45 million tonnes to 21.25 million tonnes per annum during 1987-88, but also

achieved over 100 per cent capacity utilisation. The utilisation of installed capacity, which was 95.2 per cent in 1983-84, went up in succeeding years to 100.6 per cent, 101.6 per cent, 102.8 per cent and 102.5 per cent during 1987-88 on the enhanced capacity.

The optimum use of refining capacity and higher product sales had enabled the corporation to earn a profit before tax of Rs. 571.76 crores. This included the income of Rs. 22.97 crores relating to previous years. The profit before tax of Rs. 671.22 crores during 1986-87 included Rs. 297.05 crores relating to previous years on account of implementation of the OCRC (oil cost review committee) report.

Eliminating the effect of prior year transactions, Mr. Khosla said, the profit of Rs. 548.79 crores during 1987-88 is the highest recorded by the Corporation. It is 46.7 per cent more than the profit before tax earned during 1986-87.

To meet the deficit in availability of indigenous crude during 1987-88, Indian Oil, as the canalising agency, Mr. Khosla said, imported 18.4 million tonnes of crude oil at a cost of Rs. 2,958 crores.

PLAN FOR REFINERY IN CAUVERY BASIN

There is a plan to set up a small refinery in the Cauvery Basin which is emerging as a major oil producing area in the country.

The idea is conceived in the wake of the problems being faced in transportation of oil from the basin to the Madras Refineries. The Oil and Natural Gas Commission (ONGC) has chalked out a programme for production of five million lakh tonnes crude from the area in the near future.

Inaugurating the 42nd annual general meeting of the Hindustan Chamber of Commerce (HCC) in Madras, Mr. G.V. Ramakrishna, Advisor to the Tamil Nadu Governor, said the refinery could be expanded further in step with increase in production with provisions for secondary processing.

In the field of natural gas also, the Cauvery Basin holds good prospects and plans are afoot to generate power in a small way using the gas. In view of the large potential for natural gas production in the area, "we can think in terms of generating hundreds of megawatts of power in another five year's time", Mr. Ramakrishna said.

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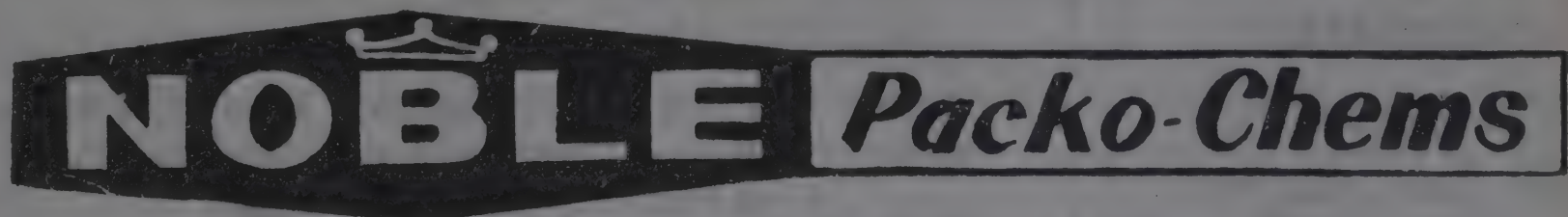
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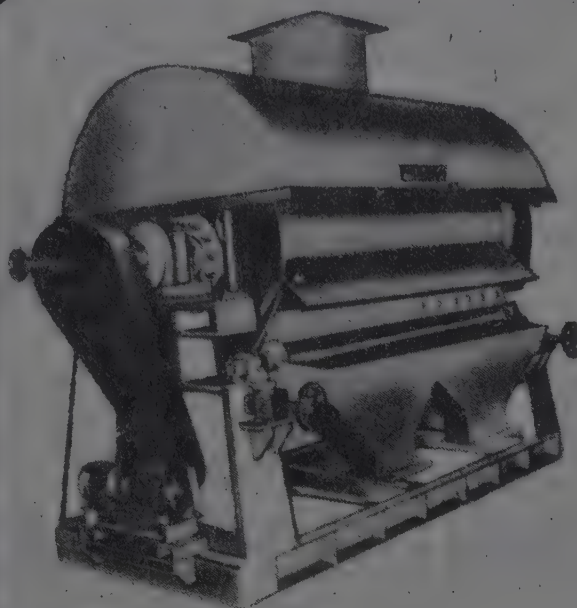
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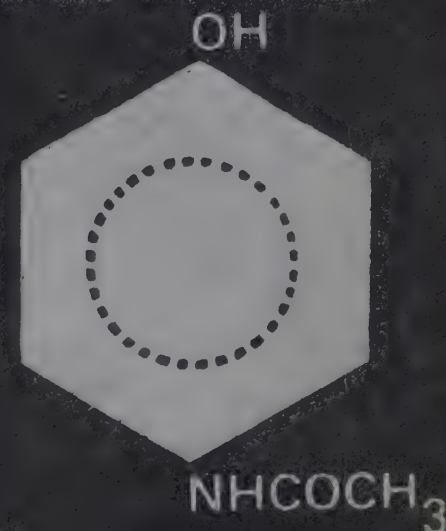
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IOC plans 2 refineries

The Indian Oil Corporation Chairman, Mr. Sheelkumar Lalchand Khosla, said that proposals for constructing two grassroot refineries in eastern and central India, of six million tonnes per annum (MTPA) capacity at a cost of Rs. 1800 crores, are under consideration as part of a long term plan to meet India's growing demand for petroleum products.

The exact location of the refineries was yet to be decided, he added.

Mr. Khosla said that the present buyers market trend in the world would continue for a few more years because of glut in the oil production. India was fully utilising the favourable trend to build adequate reserves, by buying from the open market.

Later addressing the Asia-Pacific petroleum conference on its concluding day in Singapore, Mr. Khosla said that India's demand for petroleum products would rise to a level of about 53 MTPA by 1990 and 94 MTPA by the turn of the century.

He said that crude oil production was estimated to go up to about 49 million tonnes by the year 2000.

Mr. Khosla said the increasing demand would obviously place very heavy pressure on India's current efforts for augmenting indigenous crude oil production. "We have, therefore, to establish large reserves during this period and put them on production."

He said that to bridge the gap between requirement and availability of crude oil and with a view to achieving self-reliance, exploration activities had been increased manifold, both onshore and offshore.

The capacity of the existing 12 refineries in India after completion of debottlenecks would reach a level of about 52 MTPA by the end of 1988. No further additional refining was expected to be realised till the next three to four years.

To meet the increasing demand, Mr. Khosla said that grassroot refining capacity to the extent of about 11 million tonnes with maximisation of middle distillates was being planned for materialisation by 1995.

These were at Karnal six million tonnes, Mangalore three million tonnes and Assam two million tonnes, he added.

Even with materialisation of this additional refining capacity, India was expected to reach a self-sufficiency

level in refining of about 77.8 per cent by 1995.

He said to meet the demand of petroleum products by the turn of the century, India would either have to enhance the refining capacity or increase import of finished products.

"India will adopt an optimal mix of the two taking into account various factors that have bearing on them", Mr. Khosla said.

Retroactive IBRD aid for ONGC projects

The World Bank has agreed for retroactive financing of up to \$25 million against loans tied up for specified projects of the Oil and Natural Gas Commission (ONGC).

The facility of retroactive financing will help ONGC to cut down the delay in execution of World Bank-financed projects which occurs because of the time gap between the sanctioning of a loan for a project by the Bank and the formal signing of an agreement to that effect. The time gap can range between a few months and even a year.

With this latest facility, ONGC can start work on a project the moment the loan for it is sanctioned and can claim funds up to \$25 million from the World Bank when the agreement is formally signed.

In line with this policy decision, the World Bank has agreed for retroactive financing of \$25 million for the western gas development project.

The western gas development project has been identified by ONGC to accelerate the development of the offshore and onshore gas resources and markets in the western parts of India. The World Bank has agreed to finance a part of the total project cost of approximately Rs. 1,550 crores to the extent of \$295 million (Rs. 383.5 crores).

In another major development, the World Bank has given \$15 million each in the Krishna-Godavari, South Bassein and Cambay basin petroleum projects to the Reserve Bank, for expeditious disbursement of claims. Yet another facility granted for the recent loan has been to increase the limit for well services and drilling materials procurement limit to \$1 million from \$0.2 million.

ONGC has so far received \$1,392.3 million as loans from the World Bank, tied to its specific projects.

Notwithstanding the degree of self-sufficiency India has to gear up to meet the growing challenges in terms of modernisation of the existing refineries using latest technologies, augmentation of refining capacity and exploring alternate resources of energy.

He said that India was presently importing 18 million tonnes of oil over the domestic production of 30 million tonnes annually. It imported petroleum products worth three million tonnes.

The various projects for which it has received loans include the Bombay High development phase-I and II, Krishna-Godavari exploration project, South Bassein gas development project, Cambay basin petroleum project and the recently awarded western gas development project.

The Krishna-Godavari project loan agreement was signed between the Union Government and the World Bank in November, 1982, for financing a portion of the foreign exchange cost of exploration in the Krishna-Godavari project area, involving an amount of \$165.5 million. Until July, 1988, an amount of \$134.7 million had been utilised.

The South Bassein is the largest free gas offshore field in the country and is being developed to supply 10 million cubic metres of gas per day along the fertiliser and power plants enroute the HBJ pipeline.

The loan agreement for the South Bassein project for financing a portion of the foreign exchange cost was signed with the World Bank in March, 1983. The World Bank contribution, amounting to \$139.3 million is intended to finance the pipe laying contract, platform installation and technical services. As on July 1, 1988, an amount of Rs. 127.49 million had been utilised.

The Cambay Basin petroleum project has been granted World Bank aid to the extent of \$42.5 million.

The largest loan amount of \$400 million was taken by ONGC in funding the phase-II of the Bombay High offshore development project. The project was aimed to reach a production rate of 2,40,000 barrels of oil per day through primary development of the southern and central areas of the Bombay High field. The execution of the project has been lavishly praised by the World Bank.

CAUVERY, K-G BASIN DISCOVERIES

ONGC studying long-term potential

To firm up the recent spate of oil-and-gas discoveries in the Cauvery as also the Krishna-Godavari basins, the Oil and Natural Gas Commission (ONGC) has drawn up plans for "delineation and reservoir engineering studies". The objective is to evaluate accurately the likely long-term potential of these discoveries.

While "delineation studies" are already under way in certain key pockets of the Krishna-Godavari basin, a similar "delineation" exercise for the Cauvery basin is now on the drawing board.

The "delineation studies" will help determine the geographical and geological limits of each separate oil field; and the "reservoir engineering studies" will help assess the actual commercially-exploitable potential of each of these fields.

Pending these exercises, only some "guesstimates" on the likely potential of these discoveries are possible at this stage.

Though there is also no authoritative word on the total production potential actually identified in exploratory drilling in the southern region so far, some indications are nonetheless available.

These rough indications reveal that the wells where oil has already been struck by ONGC in the Cauvery basin (both inland and offshore belts) can at present yield a total of over 800 tonnes per day.

This is only an exploratory level of production and not the optimal scale of possible output from these very same wells, most of which are not "on the tap" and are kept closed pending further studies or pending the identification of a ready consumer, as the case may be.

By the same reckoning, the aggregate yield of natural gas from these wells in the Cauvery basin can be of the order of well over six lakh cubic metres per day, excluding the uneconomic recovery of some "associated gas". Much of the six-lakh-plus cubic metres is "free-flowing gas", as distinct from "associated gas", which refers to gas that gushes out along with oil.

The break-up of the above data is as follows: Natural gas in the Cauvery basin — 6.00 lakh cubic metres of "free-flowing" gas per day from PY-1-8 well near Cuddalore off the Tamil Nadu coast; 40,000

CMD of "free" as also "associated gas" from two inland wells in Kovilkalappal; 18,000 CMD "associated gas" from an inland well in Bhuvanagiri; 8,000 CMD of "associated gas" from (apparently) each of the four inland wells in Narimanam and about 6,000 CMD of "associated gas" from an onshore well in Nannilam. Almost all these wells are now kept closed for reasons already noted.

Of this, at the PY-1-8 well where "free-flowing" gas was very recently struck, about 3.60 lakh CMD gushes out at one zone in the well, while another 2.40 lakh CMD flows out at another zone. The well itself is kept capped, while pipeline engineering details are now being studied for transporting this offshore gas to prospective inland users. The economics of such a pipeline network is also under study.

In another Cauvery offshore structure or "prospect", PY-3-2 well has also yielded some quantity of "associated gas". It may be "uneconomic" to transport this gas at the current output ratio.

As for the oil struck so far in the Cauvery basin, estimated at over a total of 800 tonnes per day, the offshore PY-3-2 well off Port Novo on the Tamil Nadu coast, alone accounts for 4,000 barrels per day or about 570 tonnes per day. This well too is kept capped.

The other oil potential identified so far in the Cauvery basin (all inland wells) is as follows: 180 tonnes per day (at an average rate of 45 TPD at each of four wells) in the Narimanam structure; 65 TPD at one well in Nannilam prospect; about five TPD at a couple of gas-bearing wells at Kovilkalappal and about 10 TPD at another gas well in Bhuvanagiri.

While oil from a few wells in the Narimanam prospect is being produced and sent to the Madras Refineries, ONGC has committed itself to sell the "associated gas" of the same prospect to local industries, besides committing to supply 40,000 CMD of gas from Kovilkalappal to the Tamil Nadu Electricity Board, for power generation, and another 18,000 CMD of gas from Bhuvanagiri for industrial use.

As for relatively longer range prospects, ONGC appears to be working on a plan to establish production potential of at least 1,000 TPD of oil and 1.10 lakh CMD of "associated gas" from the Narimanam structure alone before the end of the Seventh Plan. To this end, "delineation and reservoir engineering studies" will be undertaken by drilling more wells too in the same structure.

In the Kovilkalappal structure which is rated to be a "small field", "delineation" has already been conducted (the only place in the Cauvery basin where "delineation" has been done). Results so far have shown that the gas supply commitment made to TNEB from out of this oil field may turn out to be its only potential.

"Delineation plans" for the "complicated" Bhuvanagiri oilfield, presently expected to be a "moderately big one", may be implemented from October next year. The idea is to establish a minimum production potential of 0.50 million tonnes of oil per annum and one million CMD of "associated gas" in this field by the end of the Eighth Plan.

Work has also begun on drawing up "delineation plans" for the Cauvery offshore basin where the recent discovery of gas in one well and oil in another has given a new impetus to the search.

As for the Krishna-Godavari basin, where a string of wells have been drilled, "delineation studies" are already in full swing in several pockets in both the inland and offshore structures.

So far, a production potential of at least 1.40 million CMD of mostly "free-flowing gas" has been established in the inland basin, with about half-a-dozen wells at different locations "showing the way" as it were.

Overall, by the end of the Seventh Plan, ONGC has committed itself to a gas supply of the order of at least 2.40 million CMD from the K-G inland basin alone. This quantity will be made available from out of 35 wells.

With "delineation studies" already under way and with new discoveries like the one at Mandapeta (1.70 lakh CMD of gas potential estimated there alone), ONGC is apparently pressing ahead in the K-G inland basin.

Aluminium exports planned

Having achieved almost 100 per cent self-sufficiency in aluminium, the government is planning to consolidate its position and move towards its exports.

The government also plans to increase its efforts towards achieving higher levels of production of other non-ferrous metals like copper, zinc, lead and magnesium to meet the domestic demand.

For this, a working group under the chairmanship of the secretary in the department of mines has been set up by the Planning Commission. The group comprises representatives of the department of mines, finance ministry, DGTD, Planning Commission, DSIR, environment, power, petroleum and natural gas, MMTC, CEI, Indian Institute of Metals, Indian Institute of Economic Growth and the Indian Non-ferrous Metals Manufacturers Association.

The working group will make brief critical analysis of the world scenario of non-ferrous and other metals, including past performance and future forecast on availability of ores, concentrates, metals and semis with price trends in the past and future forecast.

It will review the achievements of the industry up to and during the Seventh Plan along with an analysis of demand and consumption, capacity and production in 1988-89 and 1989-90 in relation to the targets.

The group will assess the quantitative and qualitative reserves and resources of ore and minerals in various regions in the country. An estimate of indigenous demand of non-ferrous metals for the period 1990-95 will be made taking into account the projected pattern of growth in the consuming sectors. The demand on account of the strategic requirements of the economy for the same period will also be identified and indicated.

It will examine the level at which indigenous production of these metals should be planned taking into account the strategic requirements of the economy, resource endowments, costs of production, and other techno-economic considerations, including the present and emerging technologies. At the same time, the feasibility of producing exportable surplus in their value-added products will be examined. On the basis of this examination the capacity and production targets for meeting the demand both in the short term and

in perspective of ten and 15 years will be indicated.

For realising these production levels and capacities, the available alternatives like setting up of new capacities, expansion of existing capacities, or a combination of both, will be examined.

The group will review the status of technology for suggesting modernisation inter-alia indicating the types and size of machinery and equipment needed for mines and smelters and for identifying the gaps and deficiencies in the existing manufacturing capacities in the country and suggest measures to remove them.

It will assess the requirement and availability of major scarce inputs required to achieve the indicated targets and suggest measures that need to be taken to ensure their adequate supply at reasonable prices.

The group will also assess the infrastructure requirements like railways, power, port facilities, roads and trained manpower requirements for supporting the level of production and capacity creation recommended on the basis of the policy framework.

The working group is expected to

submit its report by December 31, 1988.

TNEB TO SET UP 2 GAS-BASED MINI POWER PLANTS

The Tamil Nadu Electricity Board will commission two gas-based mini power plants of five mw each at Kovilkalappal and at Bhuvanagiri. Using natural gas from ONGC's wells in the two oilfields, both will be ready in about a year.

The plan to set up a five mw gas turbine at Kovilkalappal has been on the cards for several months, whereas the scheme for a similar plant at Bhuvanagiri was firmed up only very recently.

Giving details, the TNEB Chairman, Mr. K. Venkatesan, told newsmen that the turbines, to be fabricated by the Hindustan Aeronautics Ltd., will entail a capital outlay of Rs. 7 crores to Rs. 8 crores each.

Asked why TNEB is not importing the gas turbines, he pointed out that there is not much difference between aero-engines and gas turbines of this capacity. Moreover, HAL itself will apparently perform a "semi-assembling" job, with the back-up of some foreign knowhow, he indicated without wishing to speak for HAL.

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Distance criteria for delicensed industries modified

The Union Government has relaxed the locational policy for MRTP and FERA companies in respect of their investment in delicensed industries.

Simultaneously, the locational policy for non-MRTP and non-FERA companies has been tightened. Earlier the locational policy for MRTP and FERA companies was stricter than that for non-MRTP and non-FERA companies. Now, the policy will be the same for both categories.

These changes are the outcome of the Government's attempt to introduce a uniform locational policy for companies coming under MRTP Act and FERA as well as those falling outside their purview.

The changes would mean that the larger houses would now get increased access for investment in locations nearer to cities which were not open to them earlier. Similarly, the non-MRTP and non-FERA companies (small and medium units) would be denied the facility of in-

vesting in certain areas nearer the cities which were earlier open to them.

According to a press note issued by the Industry Ministry the delicensing facilities extended to non-MRTP, non-FERA companies and MRTP and FERA companies will not be available if the industrial units is located within certain specified limits from the cities.

These limits are: 50 km from the boundary of the standard urban area limits of any city having a population greater than 25 lakhs according to the 1981 census or 30 km from the boundary of the standard urban area limits of any city having a population of more than 15 lakhs but less than 25 lakhs or 15 km from the boundary of the standard urban area limits of any city having a population of more than 7.5 lakhs but less than 15 lakhs or the standard urban area or municipal limits of other cities and towns.

Thus, investments in delicensed industries located outside these

specified areas would alone get the delicensing facility as per the new locational policy.

It is further clarified that the industrial undertakings already holding a valid registration issued by the Secretariat of Industrial Approvals or by any of the technical authorities under the relevant delicensing scheme need not apply for carry-on-business (cob) licences.

In that case, the registration already granted to them will be regarded as a valid authority for carrying on business in respect of the product quantity and location mentioned in the registration certificates, notwithstanding the fact that the location of the industrial undertaking falls within the distance criteria mentioned in the new location policy.

However, for effecting substantial expansion of the capacity for undertaking manufacture of a new article at the same location, the industrial undertaking should apply for a licence under the relevant provisions of Industries (Development and Regulation) Act, 1951.

The changes in the location policy would affect a large number of industries which were delicensed in the last three years. In March 1985, 28 industries including 82 bulk drugs were delicensed for non-MRTP and non-FERA companies subject inter alia to the condition that the location of the undertaking should not fall within the standard urban area limits as determined in the census of India, 1981 of a city having a population of more than one million or within the municipal limits of a city with a population of more than five lakhs.

In March 1986, another 71 industries were delicensed for MRTP and FERA companies for locations in backward areas. This was subject to the condition that the industrial undertaking is not located within a radius of 100 km of a city having population of 25 lakhs, according to the 1981 census.

In June 1988, the delicensing facility was extended to non-MRTP and non-FERA companies provided the investment takes place in locations within specified distances from certain cities. It is these limits that have been taken as the uniform locational policy for both MRTP, FERA and non-MRTP, non-FERA companies.

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Disposal of imported material allowed

The Union government has made a major policy relaxation by permitting disposal of imported materials by exporters under the advance licensing scheme. At present, it is not allowed.

After a series of inter-ministerial discussions, the government has finally allowed the sale of imported materials in the domestic market where the exporters shipped their products by using materials either from their own stocks or obtained the same from other sources.

To begin with, this facility is being given in the case of exports of chemicals, petrochemicals and engineering goods, according to authoritative sources.

If this relaxation in the policy works satisfactorily, the disposal of imported materials in the domestic market in respect of other export items will be considered by the government.

This issue was hanging fire for the last four months. It was suggested by the chairman of the Federation of Indian Export Organisations

(FIEO), Mr. Ramu Deora that once the exporters fulfilled their commitments by exporting goods using materials from their own stocks or procured the same from other sources, they should be free to sell the imported inputs in the domestic market.

It was pointed out by exporters that in certain cases they could not export their products because of the delay in the arrival of imported inputs under the advance licensing scheme. A relaxation in the disposal of the imported materials is expected to result in increased exports because that would enable them to meet their commitments to foreign buyers, it was argued.

Since the sale of imported inputs in the domestic market is a sensitive issue because this facility could be misused by exporters, the revenue secretary in the Union ministry of finance was opposing the proposal put forward by the FIEO chairman.

The inter-ministerial discussions continued over a period of four months. The committee of secretaries which met recently, where the

revenue secretary was also present, agreed to make the relaxation.

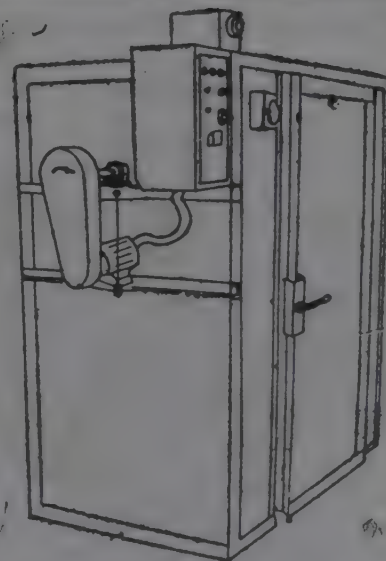
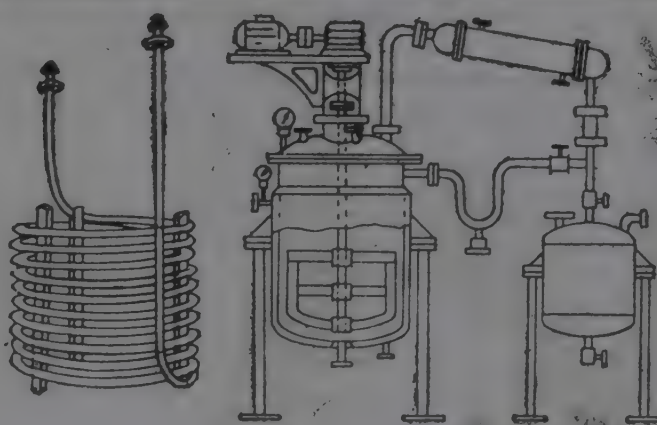
On the basis of the committee's recommendation, the Union government cleared the issue, the sources say.

However, exporters will be told in explicit terms not to indulge in malpractice. If any misuse was detected, penal action, which may include blacklisting, would be taken against the defaulting exporters, the sources said.

In the normal course, the government would not have allowed relaxation in the disposal of imported materials in the domestic market under the advance licensing scheme. Since exports are to be increased considerably over the years to check the growing import bill, the government, however, agreed to give this facility to exporters.

The Cabinet secretary, Mr. B.G. Deshmukh, has been holding discussions with senior officials of other ministries every week on measures to promote exports in 1988-89. It is expected that export earnings may touch a record Rs. 20,000 crores in the current year compared with Rs. 15,719.4 crores in 1987-88.

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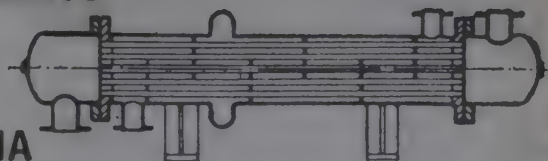
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'Single-window' for ecology clearance

The Ministry of Environment and Forests has decided to accord with immediate effect 'single-window' environment and forest clearance for projects awaiting its approval.

Projects will be cleared from the environmental and forest angle simultaneously even though approval letters may be issued separately.

This has been done to facilitate quick decisions regarding project clearance, officials say.

Under the new procedure, when a project requires both environmental clearance and approval under the Forest (Conservation) Act, 1980, proposals for both must be simultaneously given to the corresponding divisions in the Ministry.

The processing of proposals will be done simultaneously and clearance or rejection will be for both together, although separate letters may be issued.

If only environmental clearance is required (when there is no diver-

sion of forest land) the case will be processed only from this angle.

For environmental clearance, the proposals must come from the project authorities to the Ministry with all necessary details.

The Ministry has already circulated environmental guidelines, questionnaires and checklists which list the information required.

If all the particulars, information and action plans are available, the Ministry will take a decision on the clearance within three months of receipt of the proposal.

According to Ministry officials, it is often found that the proposals lack necessary details and essential information. In such cases, the Ministry asks the project authorities for such information.

At present there is no time limit for submission of such information. As a result, projects remain pending with the Ministry for indefinite periods. Only after the de-

tails are available are the projects processed for a decision.

From now onwards, project authorities will be required to submit the missing information and action plans within three months, failing which the case will be rejected for non-furnishing of information.

For proposals needing approval under the Forest (Conservation) Act, the cases are considered taking the views of the advisory committee. A decision is usually taken within six weeks of the receipt of the proposal.

If particulars are not available within three weeks of a request for the information, the cases are closed and reopened when the details are available.

From now onwards, if the required particulars are not available within one month of asking, the proposals will be rejected on the ground of non-furnishing of information.

If the proposal is complete in all details, a decision will be taken by the Ministry within six weeks of the receipt of the proposal.

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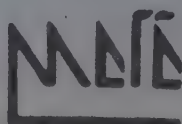
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EXPANSION, DIVERSIFICATION

CRL drafts Rs. 300 crores plan

Cochin Refineries Ltd. has drawn up a Rs. 300-crore expansion cum diversification plan. It involves setting up a Rs. 80-crore aromatic plant to manufacture benzene and toluene, a 20-megawatt captive power plant at a cost of Rs. 57 crores, expansion of its refining capacity from 4.5 million tonnes a year to 6 million tonnes with an expenditure of Rs. 100 crores creating additional crude and LPG storage tanks at a cost of Rs. 55 crores.

Cochin Refineries, one of the handful of Indian companies to have a turnover of Rs. 1,000 crores, was set up in the early sixties as a joint venture between Phillips Petroleum company of the US, Duncan Brothers and the Union government which had the majority control.

To finance these plans the company is likely to make a rights issue at a later stage. In fact Cochin Refineries had made a 2:3 rights issue about six months back. This was stated in Cochin by Mr. Prakesh Yardi of Standard Chartered's Merchant banking division, speaking on behalf of Phillips Petroleum.

Phillips Petroleum of the US was also divesting its entire equity stake in Cochin Refineries as part of its worldwide financial restructuring plans and asset divestment programme. It may be mentioned that Philips Petroleum divested its 30 per cent equity stake in Philips Carbon Black Limited (PCBL) of Mr. R.P. Goenka, early this year.

Phillips Petroleum which initially had a 26 per cent stake in Cochin Refineries had not exercised its option to take its stake in the last rights issue, thereby bringing down its control to just about 18.49 per cent at present.

The present holding of 1,85,007 equity shares of Rs. 100 each of Philips Petroleum was now being offered to the public at a price of Rs. 200 per share which included a premium of Rs. 100, against a book value of around Rs. 450.

Although the present issue has been labelled as an "offer for sale to the public" about 25 per cent of it would be taken up by the all-India financial institutions on a firm subscription basis, five per cent of the offer was made to the employees of Cochin Refineries and it was expected that they would take it up.

The balance 1,29,507 shares were being offered to the public. However, almost all of it was unofficially underwritten by the bankers.

After this issue the government and the financial institutions would together hold about 30 per cent of the equity stake in Cochin Refineries. The issue, which opens on October 10, 1988 was being managed by the Standard Chartered Bank Merchant banking division. Commenting on the profitability of the project Mr. Yardi said that in the year ending on March 31, 1988, Cochin Refineries had achieved a turnover of Rs. 1,032 crores — only the fifth publicly quoted Indian company

to cross the Rs. 1,000 crore turnover mark.

The company made a net profit after tax of Rs. 19.5 crores against a capital base of Rs. 10 crores and achieved 91 per cent capacity utilisation. Its products, like LPG, naphtha, motor spirits, diesel, aviation fuel, have a virtually assured market. Indian Oil Corporation currently markets the products.

Its forthcoming aromatics complex would manufacture 87,200 tonnes of benzene and 12,000 tonnes of toluene per annum. For benzene which is a vital raw material for LAB, caprolactam and phenol, the refinery has a captive market in the adjacent units of Fertilisers and Chemicals (Travancore) Limited (FACT) and Hindustan Organic Chemicals Limited (HOCL).

Industry told to adopt CSIR technologies

The Minister of State for Science and Technology, Mr. K.R. Narayanan, urged industry to take up the challenge of adopting technology developed by national science laboratories.

Speaking at a function in New Delhi to mark the foundation day of the Council of Scientific and Industrial Research and presentation of the young scientist awards, he said the laboratories functioning under CSIR had come out with a number of applications and innovations.

"The industry should consider as a challenge the adoption of know-how and our efforts should be directed at ensuring that there is no time-lag between the development of a technology and its application in the industry," he said.

Mr. Narayanan said he was not opposed to 'untargeted' pursuit of scientific knowledge.

The Minister said the laboratories should constantly endeavour for links with industry. "At the every birth of technology science gains momentum and the technology we develop should be readily absorbed by the industry."

He said CSIR had played a 'commendable role' in promoting science and technology in the country for the last 40 years, developing innumerable processes, besides conducting basic research and assisting other bodies in the national missions like drinking water and oilseeds.

Mr. Narayanan said the 'crux of the problem' of Indian science was that young talented scientists need-

ed to be given more encouragement, recognition, support and responsibility.

"Scientists are very much like artists and we need to have more incentives to cheer them up for good work in science as our system does not readily give it to them," he said.

Delivering the second CSIR foundation day lecture, Prof. M.G.K. Menon, Scientific Adviser to the Prime Minister and Member of the Planning Commission, said the role and importance of CSIR had been 'grossly underestimated by the press and by CSIR itself and the scientific community.'

Prof. Menon said, 'the first step towards scientific progress is not self-defeatism but confidence. One should not forget the various accomplishments of CSIR while always focussing on its weakness.'

He said very few organisations in the country had achieved what CSIR had accomplished 'in a broad spectrum.'

The former director-general of CSIR said science could not be held responsible for failure of a system caused 'more due to mismanagement and lopsided approach by several elements involved.'

'There are many aspects to our problems and several factors are responsible for success or failure of a project but science alone is held responsible. For any system to function successfully, every component has to be competent like the scientific factor.'

Strengthen R & D base, industry told

The Union Industry Minister, Mr. J. Vengala Rao, has pulled up industry for its failure in strengthening the research and development (R & D) base despite the Government's liberal policy on technology imports.

Instead of giving utmost importance to generation, upgradations, absorption and adaptation of the imported technology, the industrial units, by and large, depended solely on their collaborators and associates. Consequently, the industries lagged behind in international competitiveness. This problem, he said, has to be tackled on a priority basis.

Mr. Rao was inaugurating the second national conference on 'inhouse R and D in industry' organised jointly by the Department of Scientific Industrial Research and the Confederation of Engineering Industry (CEI) in New Delhi on September 22.

In a number of sectors, Mr. Rao said, the productivity of the Indian industry was far below acceptable norms by international standards, labour inputs in domestic units were 3 times more than in a comparative plant in the developed countries and besides, only 50 per cent of the units had any reasonable R and D facilities. With the cost of raw materials and intermediates much higher, the capacity utilisation in some of the sub-sectors ranged from a mere 50 to 70 per cent. Consequently, the burden on domestic resources were high and the products became uncompetitive in the international market, he said.

Calling for a never-ending search for incremental improvements in the procedures for manufacturing the existing products, the primary objective, Mr. Rao said, should be to ensure that the technology status of Indian units reached parity with global standards.

Mr. Rao said the advent of computer-based automation had also brought about rapid changes in the field of manufacturing technology. Profitability and survival of the corporate sector in the global market would be largely decided by their ability to adopt the new automation technologies and computer-based manufacturing processes. There is, therefore, an urgent need to accelerate R and D efforts "at all levels" to evolve a judicious and competitive mix of available manpower and automation to gain competitive strength, he said.

Mr. Rao said that with industry having achieved a certain maturity and strength, the Government is concentrating on efficiency, productivity and quality. The objective is to ensure that by the year 2000, the country became technologically strong, self-sufficient and competitive in the more important sectors of industry.

India, he said, has abundant scientific manpower and should be able to carve out a niche in the major thrust areas — electronics, chemicals, metals, engineering goods, textiles, paper, leather and cement.

The Minister of State for Science and Technology, Mr. K.R. Narayanan, who gave away the awards for in-house R and D said although an amount of Rs. 10,000 crores (or one per cent of GNP) had been set apart for R and D in the Seventh Plan, it was not adequate and the figure must be doubled in the next decade if industry is to play a more dynamic role in the economic system.

The Government, he said, had given various incentives and concessions for R and D and if industry had the ambition to compete in the global market, it should invest more in this sphere.

Mr. Narayanan said the Government had a special responsibility in this regard and stressed the need for an integrated relationship between research, industry and education. If these could be built into the economy, the results would be impressive, he said.

The Secretary, Department of Scientific and Industrial Research, Mr. A.P. Mitra, congratulated the award winners and indicated that DSIR and CSIR would be keen to involve the award winning companies in the interaction with national R & D laboratories. In this context, he referred to the research councils and technology advisory boards which provided the forum for close interaction between industry and R and D establishments.

The Secretary, Ministry of Industry, Mrs. Otima Bordia, called for introspection by industry on its technology development efforts. The country was heavily dependent on import of technology spending about Rs. 600 crores per year on royalty alone through the 800 to 1,000 collaborations which were approved, she said.

In his address, the CEI president, Mr. Brijmohan Lal, strongly pleaded for effective teamwork in the R and D field.

The Award Winners Included:

* Shriram Fibres for its success in developing and commercialising a polyamine dispersion based on micro-crystalline polymer technology. Mr. P.P. Appachu of Shriram Fibres received the award.

The new product—'tuftan'— is a major development for leather industry and Shriram Fibres has been the first in the world to produce this product by this process.

This product has several important benefits in the leather tanning process. The company has already applied for patents not only in India but also in countries like the US, the UK, West Germany, Italy, France, Australia, Spain, Canada and Belgium.

* Cipla Limited for manufacturing anti-cancer drugs namely Vinblastine and Vincristine in association with the National Chemical Laboratory, Pune.

The company has developed another drug namely Gugulipid in collaboration with the Central Drug Research Institute, Lucknow. All the three drugs have been developed from indigenous plant sources.

Gugulipid is claimed to be the first drug of its kind in the world today for the treatment of lipid disorders, a major risk factor in coronary heart disease. This is the only Indian drug listed among the 61 world drug introductions in 1987.

STUDY UNDER WAY FOR USING GAS IN VEHICLES

The Minister of State for Petroleum and Natural Gas, Mr. Brahm Dutt, announced that Gas Authority of India Ltd. (GAIL) and Oil and Natural Gas Commission (ONGC) have undertaken pilot projects for utilisation of natural gas in transport vehicles.

The Minister, who was speaking at a seminar-cum-workshop on "gaseous fuel for transportation", said that these studies while assessing the performance of compressed natural gas (CNG) vehicles under Indian conditions, would also be useful for acquiring data on the benefits of utilising natural gas as transportation fuel. This will help establish the relative economic advantages of natural gas for the transport sector.

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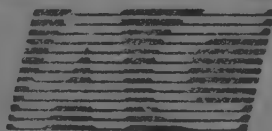
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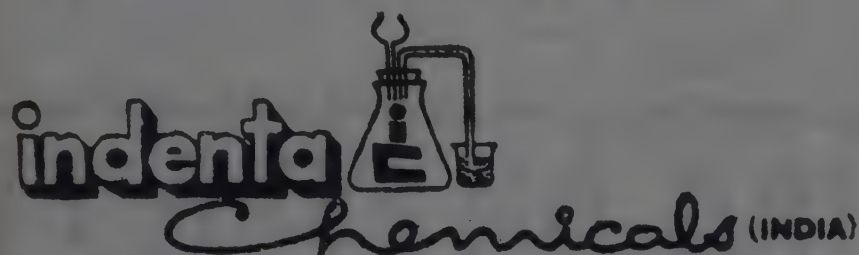
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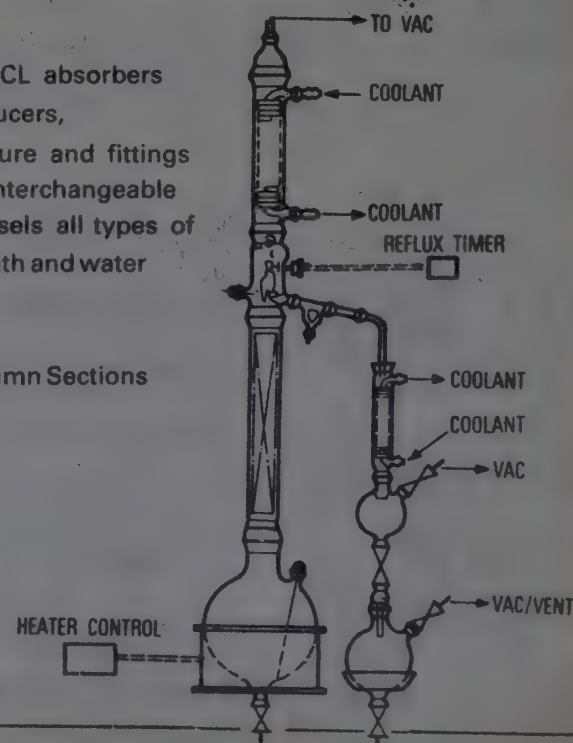
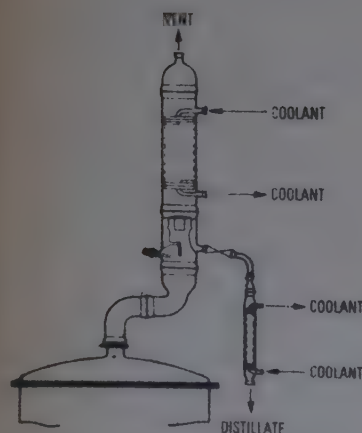
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Highlights in Chemical Technology (Part 1)

PHOSPHORUS RECOVERY PROCESS DEVELOPED

Occidental Chemical Corporation reports that it has developed and complemented successfully a new process to economically recover elemental phosphorus from a by-product generated during phosphite manufacturing at its Columbia, Tenn, phosphorus plant.

During the manufacture of elemental phosphorus, a by-product emulsion of water, phosphorus and other inorganics is generated and disposed of as waste. In the recovery process developed by the company, a dredge equipped with a suction device shines over the emulsion or sediment. The sediment then goes through several proprietary processing stages, and finally is sent through an evaporator feed system, which recovers the elemental phosphorus.

According to Jack Hurst, Senior Vice President of the company, the new process is essentially a recycling process which conserves resources by reducing energy and raw material consumption. It, also helps towards waste minimization and cost reduction. (*CMR*, 6/6/88, p. 4).

SUPERCONDUCTOR CURRENT CAPACITY JUMP TO OVER 30,000 A/SQ CM

Superconductor wire that has zero resistance at 82°K and a current carrying capacity of more than 30,000 amperes at UK has been produced at Stanford University. The capacity

for the Bi-Ca-St-Copper oxide is the highest achieved and were made from high temperature superconducting materials, reports Robert Fergelson, Director of the Crystal Science Department in the Centre for Materials Research. Commercial applications will require a capacity of at least 100,000 A/sq. Cm, but 'capacities obtained with ceramic wire up to now have been typically below 1,000 A/Sq. Cm at 4K, according to Fergelson.

The wire is made by laser-heated pedestal growth. The material is mixed, pressed into a pellet and sintered at 780°C, then broken up, pressed again and resintered (a conventional technique). Small rods are cut from the pellet and used both as source material and for seeds to produce the wire. The top of the source rod is melted by a laser, then a seed crystal is introduced into the melt and used to 'grow' the wire at a controlled rate. So far the technique has produced wire of 100 microns to 1 mm in diameter that is up to 15 in long, but theoretically there is 'no limit' to the length. (*Chem. Wk.*, 5/25/88, p. 18).

ROBOTS FOR HOSTILE ENVIRONMENTS

Japanese researchers have set their eyes on developing advanced robots for hostile environments. The Advanced Robot Technology (ART) project of Japan is working on three different types of advanced robots.

One can inspect and maintain nuclear power stations; another can walk underwater and a third, six-legged 'disaster prevention robot',

can fight fires in factories. Such robots will require a leap in computer technologies so that the robots can interpret data from their sensors.

Some of the Japan's most adventurous work in advanced robotics comes from university groups. The best known is at Waseda University of Science & Engineering in Tokyo, where Ishiro Kato and his team developed the Wasubot humanoid robot, which could play the organ.

The team's latest achievement is a more useful robot arm equipped with sophisticated pressure sensors to detect breast cancers. (*New Sci.*, 5/5/88, p. 25; *New Sci.*, 6/30/88, p. 48).

A ONE-STEP HYDROGENATION PROCESS FOR FATTY ALCOHOLS UNVEILED BY HENKEL (W. GERMANY)

Henkel (W. Germany) has recently unveiled a one step hydrogenation process for fatty alcohols and has begun engineering studies for a 20,000 tonnes/year plant based on this new process. Fatty alcohols used mainly as detergents, are normally made by esterification of natural oils and fats (such as coconut oil and tallow) with methanol, followed by distillation. The processing is then completed by hydrogenation over a copper chromite catalyst at pressures over 3000 psi. In contrast, Henkel's new process uses a new catalyst to directly react the triglycerides in the raw materials to fatty alcohols in a single step. However, the new route has yet to be proven commercially. (*Chem. Eng.*, 7/18/88, p. 17).

RECENT ADVANCES IN NITRIC ACID TECHNOLOGY

Two advances in nitric acid technology has been reported from USA. The first is a new nitric acid catalyst that reaches a peak yield quickly has been recently introduced by Engelhard Corp. (Iselin, N.J.). Called the new Hylite catalyst, it is similar in configuration to current catalyst gauze, and consists primarily of platinum with varying amounts of rhodium and palladium. An activated catalyst surface enables Hylite to reach peak yield in as few as 8 hours, compared with several days for competing products, Engelhard reports. Further, the catalyst maintains this peak level for longer periods. Added Hylite benefits include: reduced by-product formation, greater reactor stability (catalyst conversion can occur at temperatures as low as 60-70°C) and increased catalytic activity even in the presence of iron.

Backing Engelhard's claims are tests conducted at two 350 tonne/day high pressure nitric acid plants operated by Farmland Industries in Lawrence, Kansas, during which conversion efficiency at startup increased by more than 3%. Commercial trials to date have been carried out in high-pressure plants, the company believes that the same results can be duplicated in the low and medium pressure units popular in Europe and Asia. The second advance is a simplified 'two-pot' process for making upto 99% pure nitric acid. The process has been pioneered by Oak Ridge National Laboratory (Tenn). Such high strength nitric acid is currently made by extractive distillation, using magnesium nitrate as a solvent. However, the method employs high pressure and costly equipment, such as distillation towers and reboilers.

The lab scale route consists of first two major vessels: an extractive distillation pot, where 57-66 wt % HNO_3 is contacted with a boiling solution of about 70% $\text{Mg}(\text{NO}_3)_2$ to produce hyperazeotropic vapour of 80-99% W/W HNO_3 and a solvent recovery pot for regenerating the $\text{Mg}(\text{NO}_3)_2$ for recycle. Submerged feed injection lines, a pump and short transfer pipes between the vessels complete the system. (*Chem. Eng.*, 7/18/88, p. 23-25).

A NEW DATABASE FOR CALCULATING PROPERTIES OF HYDROCARBON MADE AVAILABLE BY NBS IN USA

A new database for calculating engineering properties of hydrocarbons is now at the fingertips of personal computer users for \$400 from the National Bureau of Standards (NBS), Boulder, Colo., USA.

The data base -- called DDMIX -- allows users to quickly determine various thermodynamic and transport properties of fluid mixtures selected from any of 17 possible pure components, such as carbon dioxide, methane, ethane, nitrogen, oxygen and heavy hydrocarbons such as hexane and heptane. The programme can be used to develop tables of the density, enthalpy, entropy and heat capacity of fluids as a function of temperature, pressure and composition, a feature especially useful for engineers involved in storing of shipping fluids reports Malcolm Chase, says an NBS programme manager for chemical data. (*Chem. Eng.*, 7/18/88, p. 17).

A NEW ELECTROWINNING PROCESS RECOVERS HEAVY METALS, COPPER, SILVER & GOLD FROM WASTEWATER

Prospective customers can now order a bench-scale unit that plates

out heavy metals on the cathode in an electrowinning process. EES (Houston), a subsidiary of Eltech, reports that it will provide a unit, called Retec (Jr), for two weeks at no charge and at a nominal charge for the next 6 weeks. The larger versions have found work plating out heavy metals such as copper, cadmium, tin, lead, zinc and precious metals silver and gold from wastewater. The process, it is reported, would avoid the cost of chemicals in conventional treatment while cutting the amount of sludge that has to be disposed of as hazardous waste. (*Chem. Wk.*, 6/29/88, p. 66).

AN EFFICIENT PROCESS TO MAKE PYROGEN-FREE STERILE WATER BY THE ACTION OF UV RADIATION AND OZONE

British researchers have developed an ingenious and cheaper process to produce sterile pyrogen-free water for use in hospitals, semiconductor and pharmaceutical industries. The process is based on the cleansing properties of ozone and U-V lights. In combination, the sterilizing action is far more accentuated than when used alone. To purify a water sample, technicians bubble small amounts of ozone through water bathed in U-V light. A series of chemical reactions between the ozone and the water generates highly reactive chemical reagents called hydroxyl radicals. The radicals purge organic contaminants by breaking them into harmless carbon dioxide and water. Nitrogen and sulfur contaminants are up as nitrogen gas or harmless sulfates.

Charles Cahill, researcher at the Electricity Council Laboratory, where the process was developed, believes that the technique developed could cut the cost of producing sterile pyrogen-free water by three fifths. According to Cahill it is far

cheaper to generate electrically the tiny amounts of ozone and UV light required for this technique than it is to boil the water, one current method for preparing sterile, pyrogen-free water. Also, it destroys any traces of the organisms responsible for the pyrogens.

The Electricity Council at present is testing demonstration units which can sterilize 10 litres of water an hour. It has already licensed the technology to Elga (Migh Wycombe, UK) which will sell units of this capacity in 1989 to the pharmaceutical industry.

Elga will manufacture larger units with capacity of up to 1000 litres per hour later to hospitals, big pharmaceutical manufacturers and semiconductor industry. (*New Sci.*, 7/7/88, p. 40).

SUPERCritical PROCESSING OF PLASTICS ON THE HORIZON IN U.S.A.

University Science Partners (Detroit) is seeking corporate partners for supercritical processing of plastics. Such processing uses the solvent power of dense gases of special temperatures and pressures to separate chemicals from raw materials. The company -- which has development agreement with Michigan State University, Michigan Technological University and Wayne State University -- has exclusive rights to all supercritical processing technology from its projects at Wayne State University. (*Chem. Wk.*, 7/20/88, p. 20).

GEOThermal ENERGY'S EXPLOSIVE GROWTH IN U.S.A

Today, the USA is the world's largest producer of geothermal energy, harnessing enough hot steam or water from beneath the earth's surface to generate 24 million

kilowatt hours of electricity a day. That is enough electricity to meet the needs of about 1.2 million people in USA. It is also the energy equivalent of nearly 13 million barrels of crude oil per year and it is a clean, efficient energy alternative.

The USA has a dynamic programme for geothermal energy. UNOCAL has pioneered the development of geothermal energy in USA, which has substantial resources for geothermal energy. Beneath the Salton Sea in Southern California is one of the largest geothermal hotwater fields in the world. Until now this resource could not be exploited because of the highly salty geothermal fluids encountered, causing serious scaling and corrosion. The scaling problem was primarily caused by silica precipitation. This problem has now been solved by UNOCAL researchers who developed a crystallizer/clarifier technology to control it. The researchers tested the new system successfully in a 10,000 KW pilot plant that has been in operation at the Salton Sea since 1982. Two years later they successfully tested a second production technology method that keep the silica in solution. Currently, they are evaluating these two technologies.

Solving the scaling problem was only half the battle. Corrosion was affecting all of the piping from the production well to the power plant to the reinjection well. To solve the corrosion problem, the challenge was to upgrade the piping. The researchers proceeded to test more than 120 alloys and other materials before finding a combination that did the job.

The geothermal operations at the Salton Sea is rapidly expanding. A company subsidiary is currently operating a 10,000 KW pilot power plant and a second subsidiary is

constructing a 47,500 KW plant in the same area. This represent the first ever venture of the company into electrical generating side of the geothermal energy business. (*Chem. Eng. Prog.*, 7/1988, p. 20).

WORLDWIDE MOVES TO REDUCE CFC USE

Effective in 1991, Switzerland will ban the manufacture, import and export of sprays containing chlorofluorocarbons (CFC). Currently, about 3,000 tonnes per year of sprays that use CFC as propellants are used in Switzerland.

Separately, in Japan -- where a phaseout of CFC output will begin after July 1989, with the construction of a semi-commercial plant with capacity for 500-600 tonnes/year of dichlorofluoroethane (DTE), a CFC-11 substitute. The new liquid-phase plant, located at Kashima, is designed to produce enough DTE for evaluation and application development by customers, who would otherwise use CFC, such as urethane foam manufacturers and large air-conditioning equipment producers. Asahi Glass is also operating a pilot plant at Kashima for tetra fluoroethane 134a, which the company expects will replace CFC-12 in refrigerators.

Pennwalt, the third largest CFC producer in USA, is offering CFC-1426 as an alternative to CFC-12 aerosol propellant and is testing CFC-141 B. Atochem (France) and Allied Signal of USA have a joint programme to develop non-ozone depleting CFC substitutes. The two companies believe that by pooling Atochem's expertise in steam phase reactions, and Allied Signal's strength in liquid phase reactions, they will speed up the development of new processes for making CFC substitutes. (*Chem. Wk.* 7/20/88, p. 42).

A NEW PROCESS BASED ON RADIO WAVES TO DECONTAMINATE HAZARDOUS WASTES IN SOIL UNVEILED IN USA

Decontaminating hazardous wastes in soils with radio waves has proven 99% effective in recent field test conducted by IIT Research Institute (IITRI), Chicago. The method is an extension of an in-situ technology originally developed by IITRI to extract fuels from oil shale and tar sands, using tubular electrodes inserted into the ground or laying a horizontal network of electrodes over the surface. When the electrodes are exerted by radio-frequency energy, the soil is heated, releasing any volatile compounds present.

In the IITRI trials, approximately 30 tonnes of soil contaminated with jet fuel, chlorinated hydrocarbons and waste oils were heated to between 300 and 350°F successfully removing 99.6% and 90.1% of the aromatics and 99.3% and 94.3% of the aliphatics, with boiling points below 250°F and 536°F respectively.

According to Harsh Dev, the project manager, the technique costs about as much as commercial in-situ techniques, but is faster; further, it is much less expensive and time consuming than on-site excavation, incineration and soil restoration. (*Chem. Eng.*, 8/15/88, p. 23).

BRIGHT PROSPECTS IN COMPOSITES SPAWN A BOOM IN CARBON FIBRES IN USA AND JAPAN

Bright prospects in composites are spurring a boom in carbon fibres in both USA and Japan. In USA, Amoco Performance Products, Inc. is expanding capacity for polyacrylonitrile based (PAN) carbon fibres at its Greenville, S.C. site by 600 tonnes/year and building an R & D

research centre in Atlanta, Georgia, for a combined cost of \$150 million and Hercules Inc., is forming a joint venture with Japan's Sumitomo Chemical Co., called Hisan Corp. for a \$70 million, 1700 tonnes/year PAN based unit at Decatur, Alabama.

In Japan, a new entrant into coal-pitch-based carbon fibres is Donac Co. (Osaka, Japan), with a new 300 tonnes/year plant providing competition for Mitsubishi Kaser Corp's 500 tonnes/year unit, started up last October at Sakarda (Shikokia Island). In petroleum-pitch-based carbon fibres, Nippon Oil is planning a 50 tonnes per year unit, Japan's largest. Idemitsu Kosan (Chiba) has started distributing samples of a pitch based fibre from an experimental 1 tonne/year pilot facility and others in the business such as Kashima Oil, Showa Shell Sekiyu, Toa Nenryo Kogyo and Mitsubishi Oil, are looking to expand capacity. (*Chem. Eng.*, 8/15/88, p. 27).

PRACTICAL BISMUTH SUPERCONDUCTORS APPROACHING MARKET PLACE IN JAPAN

Bismuth superconductors now have high enough critical current densities for practical applications, reports Sumitomo Electric Industries, (Osaka, Japan). The company's thin films of Bi-St-Ca-Copper oxide have achieved a current density of 1.9 million amperes/sq. cm. at 77.3°K (liquid nitrogen temperature). What is more in a 1000 gauss magnetic field the films have an adequate critical current density of 1.1 million A/sq. cm at 77.3°K.

The polycrystalline films, which are about 2,000 angstroms thick, are produced on magnesia substrates by high frequency sputtering technology. Individual superconducting grains are neatly oriented and x-ray

analysis show the material to be single phase, the company reports. Japan's National Research Institute for Metals (Tokyo and Tsukuba) was the first to come up with the Bi-St-Ca-Cu superconductor but its version included two phases. (*Chem. Wk.*, 7/27/88, p. 19; *Chem. Wk.*, 2/9/88, p. 8).

A NEW INDUSTRIAL GAS TECHNOLOGY FOR SUPERIOR THERMAL SPRAY COATING

Air Products & Chemicals reports it has developed an industrial gas technology that significantly improves the quality and performance of metal coatings deposited using the electric arc method of thermal spray coating. During such a process, which involves atomizing molten metal with compressed air, the coating metal often becomes oxidized by air as it leaves the spray gun. The new process uses a controlled atmosphere of nitrogen and argon to atomize the coating metal as it is melted into the arc spray gun, reducing oxidation and resulting in coatings with increased density, lower oxide levels and improved thermal and electrical conductivity. (*Chem. Wk.*, 7/20/88, p. 19).

AN INNOVATIVE PROTECTION OF OPTICAL FIBRES DEVELOPED BY ASAHI GLASS (JAPAN)

Protection of optical fibres by a new perfluoropolymer is reported by Asahi Glass, Tokyo, Japan. It is called 'Cytop' and is claimed to provide optical properties superior to current cladding materials such as polymethylmethacrylate and polycarbonate. With Cytop, visible light transmission is 95% compared with 93% and 87% for the other types. If present trials prove satisfactory, the new material could be commercially available by 1989. (*Textile Horizons*, 7/1988, p. 16).

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PULTRUSION — THE SPACEAGE MATERIAL

XTRU Glass is the trade mark of SSB Industries Limited for products made by the Pultrusion process. XTRU Glass profiles are fibreglass reinforced plastic, manufactured from a wide variety of high performance thermosetting resins and fibreglass reinforcements. SSB Industries Limited are the first to introduce this sophisticated technology in India in the early eighties. The fibreglass pultrusion has been discovered as having capabilities of producing products which solve many of the modern problems. As a result, high strength, light weight, structural XTRU glass material -- that will never rust, resists corrosion from a variety of chemicals and gases, is non conductive for electrical uses and fabricated quickly in the shop or at the site, have been designed and built. New long wearing industrial finishes make it even more weather resistant. Now polyester fabrics in many design can be incorporated into the shape and specific resin glass system can be developed for more critical and special innovative applications.

XTRU Glass Pultrusion Process. Pultrusion is a continuous process made by reinforcing the plastic also called the resin, with multi-strands of glass fibres. The glass in the form of continuous rovings is drawn through the liquid resin, where it gets thoroughly impregnated. The wet out fibrous laminate is pulled through a special heated die and once in the die, the resin cure is initiated by controlling precise elevated temperature. The laminate solidifies to the exact dimension of the die, as it is being continuously pulled. Since the hardened XTRU

glass is reinforced with an internal arrangement of permanently bonded, continuous glass fibres, it possesses great strength.

The characteristic is further exhausted by desirable electrical and other physical properties contributed by the chemistry of the resin. The combination of the resin gives the glass fibrous laminate an outstanding resistance to many environmental hazards such as rust, high temperatures and atmospheric pollutants. Specific strength characteristics can be designed into the composite optimizing laminate performance for a particular application by strategic placement of high performance reinforcements like mat, woven tape etc.

Processing capabilities include the production of both simple and complicated profiles. Due to high dimensional accuracy, additional or post treatments are not required. Colour is uniform throughout the cross section of the part eliminating the need of painting requirements. XTRU glass profiles manufactured are determined by the type of resin and glass.

- I. (a) Polyester general purpose grade for use upto 155°C.
- (b) Fire retardent polyester -- for flame retardent applications.
- (c) Vinyl ester resin -- for improved chemical resistance and 15 to 20% improvement in the strength of the end laminates.
- II. (a) Epoxy high temperature grade upto 180°C. The capabilities of and needs for these various resins can only be determined by the end use applications.

Pultrusion Advantage. Because of the versatility of the process it can

offer some unique advantages over other FRP process. The most obvious of these is length. The continuous nature of the process allows a larger length. Hollow sections and undercuts are relatively easy to produce compared to other FRP process.

Properties. The axial orientation of fibre glass rovings and its percentage by weight in a laminate allows the highest tensile strength of any FRP composite. The availability of the glass mat, to the process has greatly improved the traverse properties of FRP pultrusion. The heat and the pressures placed on the raw materials while being pulled through the steel die permit many properties that are attainable with compression moulding.

Pultrusion may be the only closed mould process that will allow you to combine different reinforcements styles in the same laminate. Since the process is highly automated and employs continuous input materials, the amount of labour requirement is relatively low. This will enable the pricing factor to be more competitive.

New polyester surfacing fabrics like C glass veils, can be used to create a resin rich surface for improved wearability, ultraviolet resistance and corrosion resistance of the laminate. The result of this materials performance will permit pultrusions to compete in more applications, more reliably. There is a tremendous momentum and optimism developing among pultruders. The applications that are successful are opening new avenues to pursue better processing and techniques are being developed keeping in mind of the new problems and cost of the final product.

ABLATIVE PLASTIC FOR ROCKETS

The Regional Research Laboratory in Trivandrum has developed an ablative plastic which could find application in rockets and missiles. This ablative is derived from cashewnut shell liquid. An asbestos mat impregnated with the resin can withstand temperatures over 3000°C.

The Hyderabad-based Defence Research Development Organisation (DRDL) and Vikram Sarabhai Space Centre (VSSC) are reportedly interested in this polymer which can be used as a heat shield in rockets and re-entry vehicles to protect them from high temperatures. DRDL and VSSC have initiated steps to further develop and improve this polymer.

RRL is studying why the polymer has such excellent ablation properties. Standardisation of synthesis still remains to be done but scaling up to industrial production should not be a problem. RRL has applied for a patent for the technology. The laboratory has been working with cashewnut shell liquid (CNSL) for some time now. Cardanol, its main component is a phenol with an unsaturated hydrocarbon sidechain at the m-position. This compound is difficult to synthesise.

A fire-retardant resin and the ablative polymer were developed using two routes, starting from CNSL. The "prepolymer route" involves functionalisation and oligomerisation to get a prepolymer. Anorin-38 got by the phosphorylation of cardanol, is an excellent fire retardant. Anorin-38 has a limiting oxygen index of 38.0 and is miscible with most plastics and elastomers. Experiments with polyurethanes and natural rubber have indicated that it has adequate fire-retardancy. Anorin-38 was scaled up to the 50 kg level with help

from VSSC. The technology was transferred to Simpson Polymers, a company in Bombay, which wanted to use Anorin-38 with polyurethane foam to get a light-weight fire retardant.

The resin has good bonding behaviour and is a suitable matrix resin for brakelinings, showing superior fade characteristics. Some companies are keen on procuring the Anorin-38 technology for this purpose.

RRL believes that this prepolymer, made from CNSL and phosphoric acid, both available in India, can be used for the manufacture of heat-resistant paints, varnishes and adhesives. Since it is soluble in common organic solvents, it can be processed into thermoset products with suitable curing agents.

The "dimer route", involving dimerisation and polymerisation, gives brominated Anorin-38 which is an ablative. This ablative plastic is still undergoing development. Flowers kept on top of a panel of the material can withstand oxyacetylene flames with temperatures going up to 3000°C for several minutes.

A fire retardant burns in the presence of a flame, but is extinguished when it is removed. An ablative absorbs the heat by self-sacrificial decomposition, leaving behind a pyrolytic residual graphite.

The special structural features of the phenols constituting CNSL can be used to produce high performance polymers like liquid crystalline polymers (LCP) thermoplastic elastomers (TPE), and ablative polymers (AP), says Dr. A.D. Damodaran, Director of RRL.

The availability of CNSL will not be a constraint, according to him. Though only about 15,000 tonnes

are being produced in the country, potentially 40,000 tonnes could be got. Besides, high performance polymers are low volume and high value products. The production could be limited to the availability of CNSL. If methods to extract and purify CNSL improve, its production will be cheaper.

ZERO-DEFECT YARN

Zero-defect yarn was Krislon Engineer's object when it commenced work on its two-for-one twister. Based on research and studies covering several decades of user experience, the Krislon team evolved a "wish list" enumerating every single detail that users would like to see in their yarn departments.

While some of these were tiny engineering details, a large number involved redefining materials, structural strength, acceleration and deceleration of moving parts. From this, Krislon Engineering developed specifications for the new machine. The specifications included graded cast iron sections for the mainframe, joined with steel channels and rails to ensure absolute vibration-free operation.

For the spindles, Krislon's design required dynamically balanced MTS spindles with a built-in swing-out arrangement. Individual separators would be provided between spindles to minimise air turbulence, and balloon breakers would be made from high quality ceramic. Several components, including drop wires, over-feed rollers and take-up brackets were completely redesigned to achieve higher production speeds. Three years of prototype building and testing later, the first machine was installed at Krislon's own yarn department for actual field testing. It was only after the machine had run fault-free for more than six months non-stop, then it was released on the

market. In keeping with its zero-defect design, Krislon launched it with the backing of virtually instant after sales service and demonstrations are possible at locations in three different cities.

For further details contact: Krislon Engineering Industries Pvt. Ltd., Vaswani Mansion, Dinshaw Wacha Road, Churchgate, Bombay-20.

METALLISED CERAMICS

The Central Glass and Ceramic Research Institute (CGCRI), Calcutta, has successfully developed indigenous technology for metallisation of alumina ceramics, used in nuclear and aeronautical industries.

High-density metallised alumina ceramics are used in high power vacuum and ultra high vacuum industries. They also find applications in various types of switchgears, relays, bushings, fuse housings, radio frequency insulating devices and numerous other electronic components.

In the CGCRI technology, a suspension of molybdenum and manganese powders is prepared and applied in the form of a paste of certain thickness to the ceramic surface to be metallized. The layer is fired at a temperature between 1300 and 1400°C for 15 to 30 minutes in an atmosphere reducing to molybdenum and oxidising to manganese.

Metallization is followed by nickel plating by the usual electrolysis technique, and brazing with suitable alloys. The main characteristics of metallization are: (1) it should have a very good adherence between the metal and ceramic surface, and (2) it should have good bond strength after brazing with other components which may be either metallic or ceramic. The process of metallization of alumina ceramics with suffi-

cient bond strength and high breakdown strength of the sealing (between metal and ceramic) is now ready for release to the National Research Development Corporation (NRDC) for commercial exploitation.

BUTTERFLY VALVE

FOUOKM compact butterfly valves excel other conventional valves such as gate valves, globe valves and sluice valves in all aspects particularly in terms of light weight (one-third to one-fifth of conventional valves), less number of component parts, no flange gaskets required and economical operation with low maintenance costs.

The valves seat is made of strong synthetic rubber and incorporates pressure-touch system, thereby offering a very low torque, tight shut-off with no leakage, compact actuator selection, and long service life. These valves are used in a wide variety of applications, such as industrial plants (paper and pulp, oil refinery, steel plants, fertilizer plants, etc.) water treatment (sewage treatment), shipbuilding (engine room cooling water, ballast control etc.), air conditioning (in pump rooms, heat exchanger, inlet-outlet, etc.) and smoke discharge and desulfurisation plants (in power plants and denitration plants).

Some of the special features of these valves are as follows: frictional resistance between disc and rubber seat is almost nil, thus markedly reducing operating torque, when the disc contacts the tapered projection of the rubber seat, a complete seal is attained, which results in long service life, triple seal against external leakage, excellent flow characteristics due to cavity-free construction and absence of protruding parts and the need for gaskets is eliminated.

For further details contact, Foures

Engineering (India) Pvt. Ltd., Mahalaxmi Chambers, 22, Bhulabhai Desai Road, Bombay 400 026.

KNIFE-GATE VALVES

FOUOKM knife gate valves are ideally suited for arduous conditions, and the specific problems taken care of while designing these valves are "wear", "corrosion" and "clogging". Special design features and selection of right materials make these valves the ideal choice for sewage disposal, dredging, powder, conveyance, paper pulp handling, the chemical industry and transfer of corrosive, abrasive, fibrous or highly viscous fluids.

The salient features of these valves include the following: Operating torque is almost 30% lower than conventional gate valves, precision buffered knife edge of the valve plate cuts off the suspended matter and shuts off even heavy or high viscosity fluids, internal wetted surfaces consist of corrosion and wear-resistant stainless steel lining, plane surface of the valve seat has no recess, thereby eliminating accumulation of deposits that could build up and jam the valve.

In specific cases, these valves can be supplied with deflection cones for deflecting or diverting the flow of materials past the seat ring to avoid clogging of the slurry at the seat.

For further details contact: Foures Engineering (India) Pvt. Ltd., at the above mentioned address.

DISTILLED WATER STILL

Pharmalab Industries has announced a new 80 litre capacity distilled water still that reduces energy requirements by as much as 75%. Based on a revolutionary heat-trap technology, this still uses a design totally unlike the conven-

tional Barnstead stills. The new technology does not go directly to the step of condensing the distillate. Instead of heating water in a single column, it uses a series of columns and a sophisticated heat transfer system that eliminates a large part of the energy wastage involved in conventional systems.

Conventional distilled-water technology involves heating up a large body of water into steam, and then condensing the distillate. Instead, it uses the heat energy of this steam to heat more feed water, thus generating additional distillate without requiring additional heat energy. In the process, the steam loses some of its heat, and thus the need for cooling water is also reduced.

Further advances built into the system ensure pyrogen removal, and an on-line conductivity monitoring system ensures that no condensate outside the preset conductivity levels is accepted into the collection system. Hitherto available only in very large capacities, affordable by only the largest companies, this technology has now been applied to suit the needs of small and medium scale units.

For further details contact: Pharmalab (Group) Marketing Agency, Star Metal Compound, L.B.S. Marg, Vikhroli, Bombay 400 083.

ELECTRONIC SOFTSTARTER & ENERGY SAVER

Jeltron Series SS2 Electronic Softstarter & Energy Saver, apart from effecting a softstart to 3-phase AC Induction Motors so that the motors accelerate smoothly and uniformly to their rated speeds in an adjustable built-in ramp-up time of 2 to 30 seconds, also monitors continuously for load and line voltage variations and effectively feeds the

motors with input voltages just sufficient to drive the loads at different instants under cyclic varying load conditions. Thus, the microprocessor based control dynamically adjusts the input voltage to the motor to optimize the motor efficiency. The complete cycle of continuous sensing of the motor load and the corresponding adjustment of the input voltage to the requisite level is done in less than 200 milliseconds. In such applications, where the motor is operating under reduced load or no load conditions for most part of the cyclic period. The use of JELTRON Series SS1 Electronic Softstarter & Energy Saver results in considerable savings in the energy consumed, apart from enhancing the life of the motor and the drive train, and thus, pays back itself by ways of savings in energy costs over a period of time.

Several units have already been installed at various industries like cement, paper, confectionary etc. Field trails on typical applications have shown appreciable amount of energy savings like welding generator set (53%), taper header roller machine (11.3%), sand conveyor (27%), re-chipper machine (17%), etc. With a fast response time of less than 200 millisecs for any load variation, JELTRON SS2 are useful for real time energy control. The series SS1 units are available for use with 3-phase, AC Squirrel Cage induction motors from 0.5 HP to 700 HP.

For further details contact: Jeltron Instruments (India) Pvt. Ltd., 6-3-190/2, Road No. 1, Banjara Hills, Hyderabad 500 034.

SCR POWER CONTROLLERS-ZERO VOLTAGE SWITCHING

JELTRON Series IZ1 single-phase and series 34Z1 three-phase power controller provide 0 to 100%

proportional control of output power in response to low-level input command signals. Available with current ratings of 20 to 600 Amps, all units use zero voltage switching which virtually eliminates EMI/RFI. These controllers provide, the smooth, even heater output required in temperature control applications. Units can be controlled by a milliamp input or a 0 to 10V dc analog signal for automatic operation or by a 10 K Ohm potentiometer for manual operation. Three-phase units utilise two-leg control which is comparable in performance to three-leg control but is more economical. Standard features on all units include fast-blow fuses, transient voltage protection and high PIV rated SCRs. Design features allow these units to accept a variety of input control signals. Typical applications include Temperature control, Heater Control, Oven and Furnace Control, Direct Resistance Heating, Space Heating etc.

For further details contact: Jeltron Instruments (India) Pvt. Ltd.

PID CONTROLLER FOR DISTRIBUTED CONTROL

Jeltrons model 811A single loop PID Controller is based on the micro-processor technology. It is designed to accept direct mA, mV or volt inputs or signals from thermocouples, RTDs and other specialised sensors. Cold junction compensation and the signal linearisation are built-in. Lookup tables for linearisation of signals from specialised sensors can be specified by the user. The match operations like square-rooting and integration are available for the input signal. The conditioned input signal is available for retransmission after insulation. The output can be a 4-20mA current loop or 0-5 10V. Output can be chosen to be forward or reverse acting. Indication is provided for a deviation and an

absolute alarm. Two form-C relays assigned to these alarms can be field selected to be fail safe or non-fail-safe. Deviation of the process variable from the setpoint is indicated on an LED bargraph. The input signal range can be field programmed in engineering through the front panel membrane keyboard, so also the decimal position, PID constants, process setpoint, alarm setpoints etc. The process setpoint can also be taken from a remote analogue input which is automatically scaled to the programmed range in engineering units. The process variable, control output and the other programmed parameters can be viewed on a digital display. The 811A comes with an integrated auto/manual station with bumpless transfer from the manual to auto. Apart from the PID constants, the rate of approach constant provides for antireset wind-up. The 811A has provision for the serial RS 232 or RS 422 interface. Using this data highway multiple controllers can be connected to one host computer in the control room. The host computer can not only interrogate the parameters measured and programmed but can also remotely tune the controller as well as change the setpoints. While the entire network can be centrally controlled from just one terminal, the controllers maintain single loop integrity and do not depend on the host for their individual operations.

For further details contact: Jeltron Instruments (India) Pvt. Ltd., at the address given above.

'COCKTAIL' FUEL

A 'Cocktail' of one part of benzene or diesel fuel and two parts of compressed gas was put in the tanks of trucks in Tallinn, Capital of Estonia on the Baltic Sea. Here, Estonia's first gas-filling station has been put into operation. In Tallinn, 200 automobiles have been adapted to use

cheap gas fuel, and their number keeps growing. The Tallinn bus association is also preparing to switch to compressed gas. Before the year end, 30 diesel-gas buses will have appeared in the streets of Tallinn. The new gas-filling station is designed for 500 fills daily. An automobile is capable of running over 250 km, on a tankful of this type of fuel. Conversion to gas will make auto carriage cheaper. Besides, gas is environmentally safer than benzene and diesel fuel.

About 230 gas-filling stations for almost 80,000 automobiles are now operational in the USSR. The greatest consumption of compressed gas is in the European part of Russia, where 100 stations are servicing 20,000 vehicles. By 1990 more than half a million automobiles will be converted to gaseous fuel in the USSR. As many as 160,000 sets of equipment for conversion of auto-

mobiles to compressed gas have been produced. By the year 2000, the number of diesel gas automobiles is to reach two million.

NEW GENERATION ANTITHROMBOTIC DRUG

Fragmin, an antithrombotic drug that prevents blood clots in connection with surgery and renal dialysis, represents a new generation in thrombosis. The preparation was recently approved and registered in Sweden. Much of the drug's effectiveness lies in its ability to target the various steps of the coagulation process that lead to the formation of a clot. At present Fragmin is registered as a drug which prevents the formation of clots as a result of surgery, particularly hip and abdominal surgery. It also has a prophylactic effect in conjunction with renal dialysis. (Source: Swedish International Press Bureau).

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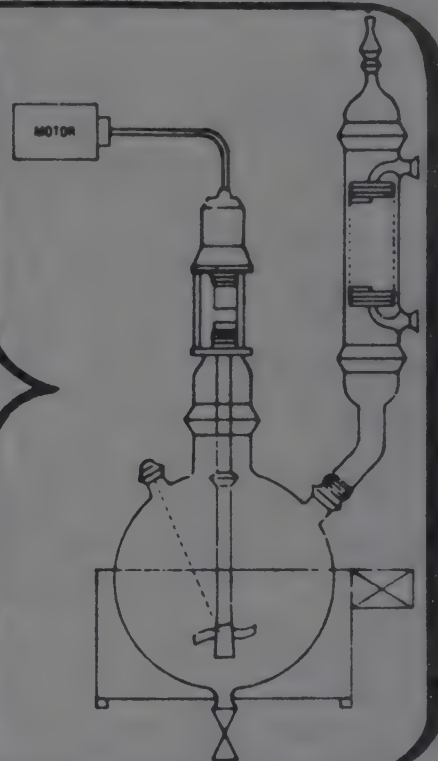
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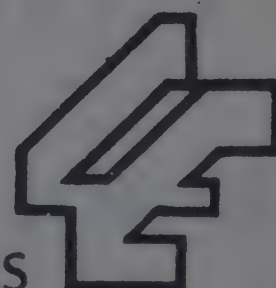


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Chemical News From Abroad

TIOXIDE PLANS SULPHATE-ROUTE PLANT IN MALAYSIA

Hard on the heels of expansion for its UK titanium dioxide (TiO_2) plant at Greatham, Tioxide has signed a statement of intent to invest in a new facility in Malaysia.

Tioxide, the world's second largest TiO_2 producer after Du Pont, plans to build a new plant in Malaysia's Terengganu state. The facility, which is likely to have a capacity of between 50-60,000 ton/year, will cost in the region of \$190m and is the result of earlier studies carried out by the company.

The project will create around 400 direct jobs. It is likely to come on stream in 1991-92 if plans go ahead. The chief minister of Terengganu said: "The final decision to proceed will be taken subject to the project being environmentally acceptable, technically feasible and financially viable."

Most surprising is Tioxide's decision to opt for the environmentally less sound and generally more expensive sulphate route at the new plant. The company has access to both the chloride and sulphate process technology although Tioxide's chloride route has not proved satisfactory to date and is only now being uprated at its UK plant. A spokesman said that the sulphate technology it proposes to employ has been significantly improved and will prove very satisfactory to the Malaysian authorities on environmental grounds.

According to a Tioxide spokesman, it is planned to neutralize the waste sulphuric acid through the addition of locally available

limestone to produce gypsum. Some of this will be used for the manufacture of plasterboard while surplus product will be dumped in landfill sites or natural caverns. The spokesman said the waste acid will not be a hazard once it has been neutralized. The pigment from the sulphate route is also said to be much improved, to match that of chloride processes.

The proposed plant is believed to be the first sulphate route titanium dioxide facility since Tioxide built its joint venture unit at Huelva, Spain with ERT in the early 1970s.

Current worldwide titanium dioxide capacity at Tioxide which is jointly owned by Cookson Group and ICI of the UK, stands at around 500,000

ton/year. It has focused on building in the Pacific Basin area which is witnessing higher demand growth than the global average put at about 3 per cent/year. Du Pont has also earmarked this region for two of its planned TiO_2 units.

Meanwhile, further details are now available on NL Chemicals' plans to build a new titanium dioxide plant at Lake Charles, Louisiana. The \$200m facility marks NL's re-entry into US production since it was forced to close its plants at Sayreville, New Jersey and St. Louis, Missouri six years ago because of environmental problems. Both facilities were based on the sulphate route.

The plant will be the first Greenfield TiO_2 project in the US since 1978. Based on the chloride route, construction is scheduled to begin early next year with

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production start up planned for 1991. Capacity is put at 80,000 ton/year.

According to NL Chemicals, annual worldwide demand for the white pigment stands at around 3m ton with one third of this accounted for by US consumption.

The new plant will take the company's overall TiO_2 capacity to 405,000 ton or some 13 per cent of world supply.

DU PONT TiO_2 SETBACK IN BRAZIL

Du Pont has met with a setback in its plan to build a 60,000 ton/year titanium dioxide (TiO_2) plant in Brazil. A joint venture formed just last year between Du Pont do Brazil and Andrade Gutierrez, a local construction group, is to be wound up because of lack of progress and failure by the companies to finalize the agreement.

Meanwhile, the US major is hoping to see some progress on its plans for a TiO_2 plant in Taiwan. Environmental groups have raised objections to the scheme but Du Pont said it hopes that a report shortly to be submitted to

the Taiwanese government will help towards "community understanding". The company is looking to move ahead with its plans for a 60,000 ton/year plant within the next couple of months.

Du Pont says it still considers Brazil a good market in which to invest and is looking at various routes to pursue its plans. Demand growth for TiO_2 in Latin America is put at 5 per cent/year, higher than the global average.

Du Pont is in talks with the government and is seeking an option to proceed independently of a joint venture partner. But the government is said to be more keen on Du Pont building the plant with a local firm.

The severing of Du Pont's links with Andrade Gutierrez will not affect the US firm's agreement to purchase Brazilian anatase concentrate for use as TiO_2 feedstock, a spokesman said.

Andrade Gutierrez already has a foothold in the TiO_2 market through an association with Bayer in Titanio do Brazil (Tibras), the country's only domestic producer.

SPANISH FERTILIZER MERGER FINALIZED

The merger of Cros and ERT's fertilizer interests has now been formalized with the formation of a new entity Fertilizantes Espanoles (Fesa) which includes the original Cros-ERT fertilizer joint venture Fosforico Espanol.

Fernando Magro, director general for chemicals at Spain's ministry of industry, recently said that a further 70,000 ton must be cut from domestic capacity but did not specify which private sector plants would have to close. State-owned Enfersa is to close down its uneconomic Aviles ammonia plant in September.

Enfersa is close to completing its Pta.1.6bn (\$13m) acquisition of family-owned Carillo which will almost complete the restructuring of Spain's public sector fertilizer company through a fusion of Enfersa and Fesa.

Meanwhile, as fertilizer imports to Spain continue to rise, the ministry of industry is preparing to ask the EEC for a safety clause setting a quota on the level of fertilizer bought from abroad. Spain is also seeking to

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AHP GO-AHEAD

American home products expects to receive final approval for its acquisition of A. H. Robins shortly, following a US district court's indication that it intends to approve AHP's reorganization plans for the bankrupt Robins. These include the setting up of an independent trust to pay compensation to women who suffered injury from Robins' Dalkon Shield contraceptive device. AHP will put almost \$2.38bn into the fund.

In a ballot, over 94 per cent of claimants' favoured AHP's proposal. Under US law, only two thirds of claimants need agree. Nevertheless, it is reported there may be an appeal from a minority opposed to the settlement.

FOTHERGILL SALE

Fothergill and Harvey's metal surface coatings business is being acquired by UK coatings and plating concern Norman Hay for just under £3.3m (\$5.5m).

Fothergill & Harvey, a subsidiary of the chemicals, textiles and industrial products group Courtaulds, put the business up for sale earlier this year.

Sales of Fothergill Engineered Surfaces are around £5m and will give a considerable boost to Norman Hay where turnover for the 12 months to end March 1988 was some £4m.

DSM, KEMIRA FERTILIZER SWAP DEAL BACK ON

DSM and Kemira are pressing ahead with their fertilizer swap deal, a month after talks were suspended because of uncertainty over permitted discharge levels from one of the plants concerned.

The deal, which may now be finalized in the autumn, will result in Kemira taking DSM's 50 per cent share in the Pernis nitrogen and phosphate fertilizers plant, run jointly with BASF and UK subsidiary UKF Fertilizers, in exchange for its one third stake in DSM's ammonia plant at Geleen.

Kemira was unhappy about specifications in the Pernis plant operating licence. Although Kemira says it can comply with the cadmium discharge levels, the company claims it cannot meet restrictions on other heavy metals including copper, zinc, chromium and nickel. The Dutch government planned to limit discharges of these metals to half the 1985 levels by 1994, in line with the outcome of the Rhine-bank states conference.

Following negotiations with the two companies, the govern-

ment has relaxed its requirement to allow Kemira to develop the technology to limit the metal discharges. The company says it can reduce the levels by 35 per cent.

The new Pernis operating licence runs until 1991, with the possibility to have it extended to 1994.

Negotiations are now focusing on personnel. Kemira plans to rationalize the new businesses, but according to a spokesperson this will not result in a reduction of capacities. An independent operating company will be set up to run the Pernis plant.

The swap deal fits in with DSM's plans to concentrate its fertilizer business on nitrate products, and exit the field of mixed fertilizers.

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MONTEDISON UNIT TO CLOSE

Montedison subsidiary Farmoplant has been ordered to close permanently its Massa Carrara pesticides plant by local authorities in Italy's Tuscany region.

The move came after an explosion and subsequent fire at the plant which produced a cloud of toxic gas forcing thousands of people to evacuate the area and others to seek hospital treatment.

The accident involved a tank containing a solution of cyclohexanone and the insecticide dimethoate, also known as Rogor. The cause of the explosion is being investigated. The plant resumed operations briefly before the permanent shutdown was ordered.

The Rogor plant has been dogged by accidents dating back to the late 1970s.

As recently as last October, it was involved in controversy after 70 per cent of the local population voted in a referendum for the plant's closure because it was considered a health and environmental hazard. But, threatened with substantial job losses, workers' unions strongly opposed the move setting in motion a series of decisions and counter-decisions on the closure.

Finally, just two weeks ago, Farmoplant secured the go-ahead to resume production from the regional administrative court of Tuscany.

Italian environmental groups are thinking of taking legal action against the regional court judges who allowed the plant to resume operations.

EXXON, JSR IN EP RUBBER DEAL

Exxon Chemical Co. and Japan Synthetic Rubber Co. (JSR) have signed an agreement for the joint

development of ethylene-propylene (EP) rubber technology.

The two companies will develop new process technology aimed at providing products with new property advantages, and will consider establishing a joint venture EP rubber manufacturing company in Japan to commercialize the technology.

Exxon and JSR have also set up an EP rubber supply arrangement whereby Exxon will produce several of the Japanese firm's rubber grades in its plants for JSR sales to customers primarily in the US market. Similarly, JSR will produce Exxon EP rubber grades at its facilities for sales mainly in the Asia Pacific region.

The companies have been joint venture partners for 20 years in Japan Butyl Rubber.

ARCMA FIRMS CONSOLIDATE

Quest International, a leading flavours and fragrances business created by the merger of PPF and Naarden in 1987, has doubled its sales in Australasia. It has acquired Goodman Fielder Wattie Ltd's flavours and fragrances operations in Australia and New Zealand, with sales of around Aus\$20m (\$16m). Terms of the deal were not disclosed but it is known that bidding for the business was fierce.

Quest is one of the world's largest flavours, fragrances and food ingredients businesses. Turnover in 1987 was put at some \$650m. The company has stated its aim to become market leader in the sector which is currently led by the US group IFF which reported sales of \$746m last year.

Further expansion is expected in the Asia-Pacific region, a Quest spokesman said.

Meanwhile, Hercules' flavours and fragrances subsidiary in the

UK has changed its name to PFW (UK) Ltd. on its merger with the recently acquired Zimmermann Hobbs, an essential oils and fine chemicals concern.

PFW purchased the business at the end of last year for £4.7m (\$8m) making it one of the largest UK flavour and fragrances concerns. The new company expects an annual turnover of £25 m.

PFW has also announced the expansion of its production facilities in Milton Keynes.

Trevor Clarke, the new managing director, said integration of the two companies would enable PFW to compete in an industry that was becoming more competitive and more global.

COURTAULDS DIVESTS

Courtaulds, the UK chemicals and textiles group, is divesting its South African wood pulp business for £207m (\$348m).

The operations being sold include a two thirds interest in Saiccor which produces dissolving pulp for use in viscose fibres and in the manufacture of Cellophane. An agreement has been signed to ensure Courtaulds continues to receive supplies particularly for its US viscose plant at Mobile, Alabama.

The buyer is a consortium represented by Sappi Ltd., South Africa's largest pulp and paper company.

The UK firm's chairman Sir Christopher Hogg said: "The move marks an important step in the evolution of Courtaulds into a more focused, management intensive, growth company". Initially, proceeds from the sale will go towards reducing debt but will also enable more investment in higher added value, less cyclical areas of operation, primarily the chemical and industrial products sectors, confirmed Gordon Campbell, a Courtaulds director.

Chemical Markets Abroad

STRONG SUMMER DEMAND PROMPTS PVC PRICE HIKE

Europe's PVC and VCM markets have continued to tighten during the first half of 1988. Demand for product is still booming, there is little sign of any seasonal downturn in orders and as a consequence more price hikes are on the way.

With global demand for PVC growing at around 5 per cent/year, pundits were predicting growth of around 4 per cent in the mature West European market for 1988. However, the reality has proved markedly different, with producers reporting sales up 9 per cent during the first half of the year.

Stocks of PVC have been consistently low during the year, after the mild winter buoyed demand from the construction industry. Producers had been hoping to rebuild stock levels during the quiet summer period but with little seasonal slowdown in orders so far apparent, supplies have dipped perilously low.

Worst affected has been pipe grade material and with strong demand from the construction and packaging industries, stocks have run down as low as 10-15 days, and customers have been put on allocation to prevent further dwindling of supply. PVC exports have had to be curbed to allow producers to cope with racing domestic demand.

But against this background, producers are now gearing up for a major price initiative in September, reflecting not only the increasing tightness of PVC but also the increasing cost pressure creeping down the product chain from ethylene.

Pipe grade product, which had been steady at DM1.63-1.70/kg in June has notched up a couple of pfennig/kg, taking levels for July business to around DM1.65-

VCM capacity additions in the Asia/Pacific region ('000 ton)

		1988	1989	1990	1992
S. Korea	Lucky			300	
Taiwan	GCPC			200	
Japan*	Chiba VCM	20			
	Kashima VCM	80			
	Kanegafuchi Chemical		50		
	Mitsui Toatsu		20		
	Mitsubishi Kasei		30		
	Toyo Soda	40			
Indonesia	Subentra/Asahi Glass		150		
Thailand	Thai Plastics			140	
Australia	PICL				300

* A 24,000 ton/year plant owned by Denki Kagaku will close in 1989

Global VCM and PVC trade ('000 ton)

	VCM				PVC			
	1987		1992		1987		1992	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
US	100	390	225	375	100	230	120	275
Canada		105		225	50	42	50	50
W. Europe	4	485	70	265	260	410	245	500
Japan	42	45	50	65	182	117	240	60
L. America	280		210		90	80	105	55
E. Europe	25	40	20	100	75	245	75	220
Africa					170	25	215	10
M. East	3	105	5	105	207	106	225	125
Asia/Pacific	715		555		247	126	200	180

Source: Tecnon

1.72/kg. Producers are pushing for a further 5-10 pfennig/kg from September 1, taking prices to a minimum of DM1.70/kg for large volume customers.

With the unexpected surge in domestic demand, supplies of PVC to export markets have had to be cut back and prices have firmed sharply as a result. Most business to the Far East is now being concluded in the range \$1,200-1,250/ton fob and players are confident of prices breaking \$1,300/ton in the fourth quarter.

Export demand is still being led by the Far East. Taiwan and Korea are still in the market for product, particularly the latter as a result of the massive construction programme in the run up for the olympic games at Seoul.

The smaller volume paste market is also tightening although prices remain unchanged at DM

2.10-2.30/kg. Most business is now, however, taking place at the upper end of this level and producers look set to establish DM 2.30/kg as a minimum price from September onwards. Stocks had been fairly comfortable, but with strong demand eating into supplies, these have now dipped below three weeks.

Supply problems in the PVC market are being further exacerbated at the moment, with nearly all the European producers taking plants off line during the summer for maintenance and debottlenecking work. Extra debottlenecked capacity should help balance the market during the latter part of the year, but with the industry still smarting from the rationalization measures of the early 1980s, there is still little chance of major new capacity announcements in Europe.

The strong demand for PVC is also having an effect on the EDC and VCM markets. The EDC market is also being driven by the ethylene shortage in the US as a result of cracker problems at Shell and Texaco. A number of EDC shipments have moved from Europe to the US Gulf and spot prices have moved up \$40/ton over the past couple of months to \$290-300/ton fob.

VCM demand is also very strong, and with the shortfall of EDC supplies effectively keeping the US out of the VCM export business, demand from the Far East is having to be met out of Europe. Spot prices have jumped \$50/ton during the past two months taking current levels to \$920-950/ton fob Rotterdam and most business for July and August is being concluded at above \$1,050/ton cif Far East.

European VCM supply has been affected by a two week interruption at BASF's Ludwigshafen unit and with strong domestic and export demand, spot supplies for European buyers have all but dried up. Consumers are now lucky to find material much under DM1,400/ton free delivered. Contracts for Q3 have been settled in the range DM1,200-1,250/ton delivered but with ethylene now substantially more expensive than in Q2, producers are expecting to levy a hefty increase in September, no doubt helping the case for PVC price increases.

However, on a longer term basis, Far Eastern demand for VCM could be set to ease over the next few years, with several major plants due on stream in the Asia/Pacific region and also a number of Japanese producers demothballing units following the lifting of the temporary measures law by the trade and industry ministry, Miti.

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In Europe, the largest PVC producer EVC, the joint venture between ICI and Epichem which controls 21 per cent of the market, is believed to have made good profits since the PVC market turned up. City estimates suggest a figure of £50m (\$84.7m) for 1987, forecast to rise to £116m this year. The company has over 1m ton/year of capacity. At present European plants are operating at around 94 per cent of nameplate capacity.

TIGHT PARAXYLENE SUPPLY LIFTS Q3 CONTRACT LEVELS

Paraxylene contract prices have been settled for the third quarter. European prices reached DM940/ton, (\$501/ton) which is DM20/ton more than was expected, against second quarter levels of DM800/ton.

But US contract prices for the quarter have been agreed at 22.75 cents/pound, which is lower than market sources predicted. Paraxylene demand in the US which is on the increase was expected to have an effect on contract negotiations and pull the price up.

Most paraxylene plants have been running at full capacity, although a spate of shutdowns in Europe and the US have caused product shortfalls. In Europe, Deutsche Shell has experienced production difficulties and paraxylene customers have had supplies reduced. US companies affected by maintenance include Lyondell, Phillips, and Koch. Spot availability in the US is said to be at a minimum, with traders being reluctant to quote spot prices.

The spot market has proved small when compared with contract and this situation has heightened price differentials with so little spot product available. European prices are being talked at \$590-600/ton fob, although few customers seem willing to buy at these prices.

DMT/PTA producers have little option but to use paraxylene as feedstock to produce fibre intermediates and so eventually the higher prices will have to be paid.

With demand for fibre intermediates expected to be strong for the next few years, and DMT/PTA plants running at full capacity,

paraxylene spot prices can be expected to remain high into next year, sources say.

These costs have traditionally been difficult to pass on to textile producers.

The Far East and especially India, which is the biggest player in the spot market, will have difficulty in obtaining ever diminishing spot supplies. Product moving into India has been quoted as high as \$635/ton cif, though little is available.

Indian paraxylene customers have shown an increased willingness to enter the contract market, though prohibitive import duties of 120 per cent and past difficulties have slowed this process. Reliance Industries, the largest Indian paraxylene consumer, was expected to bring a paraxylene plant on stream in July. This is yet to happen and sources believe the start up could be delayed until the autumn.

US demand for paraxylene shows no sign of diminishing, and competition for limited product is likely to see prices rise. With no material expected in the US spot market for some time, customers experiencing shortfalls

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will have to enter the European market paying prices up to \$590/ton fob. One reason being aired for lower than expected US contract prices is resistance from major customers.

It is expected that the paraxylene market will stay tight for the next few months. Spot product is likely to become increasingly difficult to find, with customers sticking to the contract market if possible.

CAPROLACTAM UNIT NEARS COMPLETION

Caprolactam supply in India is set to receive a major fillin next year with the start up of a 50,000 ton/year unit by the Fertilizers and Chemicals Travancore (FACT). The Rs. 3.15bn (\$220 m) unit is due on stream in the first quarter of 1988.

The start up should come as some relief to the troubled nylon cord industry in India. Earlier this year, the Indian government was forced to slash the import duty on caprolactam by 45 per cent after nylon production dipped to only two thirds of capacity in the face of costly imports.

India has only one indigenous caprolactam producer, Gujarat

State Fertilizer with 22,000 ton/year and around 80,000 ton/year of material needs to be imported. Earlier this year plans were approved to expand Gujarat's capacity by 50,000 ton with a new \$235m plant at Vadodara.

CHILEAN METHANOL START-UP IMMINENT

Cape Horn Methanol (CHM) has completed construction of its 748,000 ton/year methanol plant at Cabo Negro near Punta Arenas in Chile. Mechanical work was completed in June and test runs are due to begin in August with full scale production shortly after.

Methanol from the \$330m plant will be marketed mainly in the US by Allied Signal, although product should also find its way into Europe. Last year CHM, a joint venture between Allied Signal and the Chilean state oil group Empresa Nacional de Petroleo awarded a contract to Mitsui to operate a 45,000 ton methanol carrier between Chile, the US and Europe from next year.

Most supply is, however, expected to find a home in the US Gulf to meet soaring demand for octane boosters. The Cabo Negro unit was designed by MW

Kellogg using methanol technology from West Germany's BASF.

CHINESE AROMATICS COMPLEX ON STREAM

China's Qilu Petrochemical Co. has bought a 200,000 ton/year aromatics complex on stream at Zibo in the Shandong Province. The new plant will produce 105,000 ton/year benzene, 64,000 ton/year paraxylene and 21,000 ton/year orthoxylene.

Designed by UOP, the Qilu complex marks another step in China's increasing investment in aromatics production. It is the fourth aromatics complex to come on stream in China since 1980, and is part of a movement by the Far East to become less dependent on imported products.

A fifth Chinese aromatics plant is expected on stream by the second quarter of 1989. Based at Nanjing the aromatics complex will produce 180,000 ton/year of benzene, 400,000 ton/year of paraxylene and up to 100,000 ton/year of orthoxylene. Most product out of the Chinese aromatics plants is destined for consumption in the Far East.

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Biotechnology

NOVO RECEIVES KEY BIOTECH APPROVALS

Denmark's Novo Industri has received two key approvals involving genetically engineered products. The Danish health authorities have granted the firm marketing approval for its gene-spliced insulin while the Danish national food agency has given Novo the green light to produce its fat digesting detergent enzyme **Lipolase**.

Before Novo can start producing the enzyme made by gene spliced mould fungus *Aspergillus oryzae*, it will need environmental approval from the West Sjaelland council. According to Steen Riisgaard, general manager of the detergents enzyme division: "This approval should be routine and we expect it to be granted in August."

Riisgaard expects that the food agency approval may be appealed against but he is confident that Novo will be in a position to start production at Kalundborg by the end of October. Novo

currently produces the enzyme in Japan at its Hokkaido facility. Approval is also being sought for **Lipolase** production in the US.

The fat digesting enzyme is already being marketed in some countries in powder detergents and Novo is developing a liquid form of the enzyme for liquid detergents. Riisgaard expects that the enzyme will cost about the same price as existing protein digesting detergent enzyme.

The detergent enzyme market has been depressed for some years but Novo believes that **Lipolase** will be an important product in its portfolio. Japanese detergent maker Lion launched a **Lipolase**-containing product in Tokyo and Osaka in April. "The product gained a 15.3 per cent share of the market in less than two months," added Riisgaard.

Novo has also received its first marketing approval from Denmark for its gene-spliced human insulin. This is the first approval to be granted following the positive opinion obtained from the

EEC's committee for proprietary medicinal products under the "high tech" registration procedure. Novo expects to receive marketing approvals from the other 11 EEC member states in the next few months.

The human insulin is produced using gene-spliced baker's yeast at Novo's Kalundborg facility. According to Al Lauritano, marketing manager of diabetes products: "This site will supply all our needs for the foreseeable future."

ROCHE FORMS SOVIET TEST KIT JV

Hoffmann-La Roche has signed a deal with NPO Biotechnologica, the Soviet ministry for medical firm, to establish a joint venture to produce medical diagnostic test kits in the Soviet Union. The new venture, Diaplus, will be capitalized at SFr10m (\$6.4m) and Roubles 50,000 (\$803,600) with Roche holding 40 per cent.

Diaplus will start operations in early 1989 by marketing kits produced in Switzerland. It will later build kits and eventually manufacture all components at a

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plant in Moscow by early 1994. The kits will be produced for the Soviet and other selected markets.

Currently there are no clear estimates as to the size of the Soviet market for diagnostic kits but the ministry does concede that the Soviet Union trails the West by about a decade. This deal represents Roche's first joint venture agreement with the Soviets.

Hoffmann-La Roche has targeted diagnostics as an area for growth. The diagnostics division has been the company's fastest growing division for the past five years. Hoffmann-La Roche is committed to building up its diagnostics division through acquisitions and joint ventures.

MOGEN DROPS FISH FARM BID

US based biotechnology outfit Molecular Genetics (MG) has pulled out of a bid for a majority stake in Minnesota Aqua-farm, a US fish farming outfit. MG has been considering taking the stake as a means to generate near term

cash, although it was considering developing technologies for fish breeding in the long term.

The firm decided to terminate negotiations when it encountered "too many hurdles," according to a spokesman. The biotechnology firm had set out conditions required for a full commitment but meeting these was taking longer than the company had originally anticipated.

The US firm, which pulled out of the animal health business recently, plans to return to its central business objectives of pharmaceutical and agricultural products. The firm is currently working with ten human pharmaceuticals and is developing methods and products for crop protection and improvement.

XENOVA LINKS UP WITH DU PONT

Xenova, the two year old UK biotechnology firm, has entered into a collaborative research agreement with Du Pont. The collaboration will focus on the discovery and development of small molecules derived from microor-

ganisms that can be used in cardiovascular therapy.

Under the terms of the deal, Du Pont will allow Xenova to use and develop one of its assay systems to screen compounds from microbes for therapeutic activity. Xenova will receive revenues and milestone payments during this programme. For this, Du Pont will have exclusive rights to develop and market drugs emerging from the collaboration.

Clive Crooks, Xenova's managing director, explained that the programme will focus on small molecules as they are easier to develop, patent and can be administered orally, saying: "We will be screening compounds up to molecular weights of 2,000."

Xenova is currently adopting a two pronged approach to its development. The firm plans to do contract research for other companies and develop its own portfolio independently.

The UK firm has already developed a screening method to detect antagonists of interleukin-1 (IL-1) and is using it to screen its microbial collection.

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BBL SIGNS DEAL WITH JOHNSON & JOHNSON UNIT

British Bio-technology (BBL) has entered into a long term agreement to develop cholesterol lowering drugs with McNeil Pharmaceutical, a subsidiary of Johnson & Johnson. The agreement, signed in April, involves the joint development of new chemicals arising from BBL's research into improved cholesterol reducers.

BBL says it has been working on novel "second generation" synthetic inhibitors of the liver enzyme, HMG-CoA-reductase. The enzyme is essential in the production of cholesterol. Other companies, including Merck, Sharp and Dohme, are already developing inhibitors of the enzyme but BBL says that because its drug will be totally computer

modelled and synthetic, it will have a cleaner side-effects profile than the competition and be easier to patent.

Under the agreement BBL will conduct the research, including chemical synthesis and pharmacological testing, while McNeil will carry out preclinical toxicology and clinical testing. BBL may also be involved in clinical tests.

The British firm is retaining marketing rights for the UK market and other unspecified areas while Johnson & Johnson will market the drug in the rest of the world including the US.

Two other Johnson & Johnson subsidiaries, Cilag and Ortho, may also be involved in marketing in the US. BBL hopes that the drug will be on the market by 1997 and may develop its own distribution and marketing net-

work across Europe to cope with the launch.

Although BBL will not disclose the terms of the agreement, the company said that it involves a substantial sum. BBL will receive royalties on sales of the drug, and there will be certain milestone payments during the research and development stage.

Commenting on the choice of partner, Dr. Keith McCullagh, BBL's ceo said: "We chose Johnson & Johnson because of their long-term commitment to the development of cardiovascular drugs. Of course the financial package was also very attractive. We are having no trouble finding funding." The agreement is entirely separate from Johnson & Johnson's investment in BBL.

BBL believes that HMG-CoA-reductase inhibitors will become

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a major class of drug in the future. It predicts that sales will be worth around \$2.6bn by the end of the century.

The company will continue to concentrate on large markets such as heart drugs and asthma agents in line with its aim to become a major drugs firm. However the first pharmaceuticals it will introduce will be for the niche veterinary market.

MERIEUX PLANS TURKISH PLANT

Institut Merieux, the French Lyons based vaccines producer, is planning to build a manufacturing facility in Turkey. The vaccines produced will be for protection against rabies and those used in child vaccination programmes. Institut Merieux will operate the plant with Turkish partners, although the French firm will be the majority shareholder.

Plans for the project have received approval from the Turkish state planning organization but the recent replacement of the minister of health, has caused delay. The French firm needs to clarify some points with the mi-

nistry of health before proceeding.

Institut Merieux hopes to meet up with the new minister in September and expects to start up the project by the end of the year. The French firm has declined to reveal the value or size of the Turkish project but it will probably serve both domestic and some export demand. The plant will probably be sited near Istanbul.

GERMAN FIRMS LIFT BIOTECH R&D

West Germany's chemical and pharmaceutical industries spent about DM860m (\$457m) on biotechnology R&D in 1987, according to estimates from Westing the same period, the West German consultant Raucon. During the same period, the West German government has spent about DM222m to support biotechnology research and development.

Research into human and animal pharmaceuticals accounts for about 55 per cent of the total with speciality chemicals picking up about 25 per cent of the funds. Raucon estimates that about half

the pharmaceutical funds and 15-20 per cent of biotechnology research in speciality sectors such as amino acids and enzymes went abroad.

Other areas of research to receive funding include analytical equipment (8 per cent), plant biotechnology (4.5 per cent), production equipment design (3 per cent), bioelectronics (2.5 per cent) and food processing (2 per cent). Raucon's estimates do not include biotechnology as an environmental tool.

CARLESS BUY

Pentagon Chemicals Ltd., a UK contract chemicals manufacturer, has been acquired by Carless, Capel & Leonard for £10m (\$16.8m).

Based in Workington, Cumbria, Pentagon manufactures its own products as well as carrying out contract manufacture of chemicals for the paints, pharmaceuticals, plastics and other industries. It reported pre-tax profits of £1m on sales of £5m last year.

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NEWS FROM JAPAN

LINK UP ON THAI GLUTAMATE VENTURE

Asahi Chemical Industry Co. and Takeda Chemical Industries say that they have agreed to set up a joint venture in Thailand in association with Mitsiam International Co. and Bangkok Bank Ltd. The new joint venture company, Thai Foods International Co., will first produce and export glutamic acid, an intermediate material for monosodium glutamate.

The new company having headquarters in Bangkok will have a capital of 250 million bahts. Asahi and Takeda will each own 37.5% of the equity, and Mitsiam and the Bangkok Bank group will each own 12.5%.

The new plant will be located in Nakhon Pathom, and will start operation in the spring of 1990 with a designed capacity of 25,000 tons/year. Initial investment in the construction of the plant will be some Y5 billion.

Asahi and Takeda have been manufacturing monosodium glutamate at their own respective plants in Japan and distributing the product in the domestic and international markets for many years. The recent decision was made in view of the difficulty of manufacturing competitive glutamic acid in Japan. Considering such a changing international environment, the two companies have made extensive studies on the feasibilities of setting up joint manufacturing facilities overseas and concluded that Thailand is the best place to locate such a plant. Some of the major factors

were Thailand's well-directed foreign investment policy, availability of a quality labour force and abundance of natural resources.

MITI TO ESTABLISH 352 NEW INDUSTRIAL STANDARDS (JIS)

MITI has worked out an industrial standardization programme for fiscal 1988, in which it plans to establish 352 new standards (Japanese Industrial Standards, JIS) — 102 standards relate to development and spread of new and information-related technology and 105 and 145 are related to improvement in the national life and industrial foundation respectively — revise 952 existing standards — 82 are connected with sanitation and environmental protection and 288 are intended to improve the performance of materials and parts — and newly put the JIS mark on 12 items. As of the end of last March the JIS mark was placed on a total of 1,100 items, of which 1,031 are under the jurisdiction of MITI. In line with the programme MITI is scheduled to amend application of the JIS mark to 25 items and abolish its application to 43 items.

The abovementioned move is aimed at coping with globalization of economic industrial activities, trends of technology development and society's demand for improvement in JIS.

MITI is re-examining JIS which comprised 8,223 standards at the end of last March. It envisages establishing new standards for new industrial fields involved with information technology, novel material, biotechnology, and

abolishing obsolete standards and harmonizing domestic standards with international ones.

In more concrete terms, it plans to apply the JIS mark to industrial products produced abroad, approve checkups of production facilities made by overseas inspection organs and allow foreigners to join Japanese Industrial Standards Committee. By taking these steps, it aims at accepting the GATT standard code and co-ordinating JIS with international standards in accordance with the Japanese government-set Action Programme designed to increase Japan's imports from abroad.

CENTRAL GLASS EXPANDING FLUORINE CHEMICALS BUSINESS

Central Glass Co. is emphasizing fluorine-chemical operations on the strength of its all-around inorganic/organic chemical business.

They have now become the nucleus of the company's business policy aimed at fine chemicals.

Over the past several years the company has commercialized a variety of organic fluorine compounds, fluoroplastics, high-purity inorganic fluorides and high-purity fluorine gases and constructed multipurpose/speciality plants for fluorine-chemical operations.

Applications of all these products are related to high-tech business involved with electronics and novel materials. The company has actively appropriated personnel and funds to R&D work for the said operations. It aims at launching into "niche" business and commercializing unique, high value-added products, thereby diversifying into "downstream" sectors.

The company's Ube factory lo-

serves as a production base for fluorine chemicals. It is staffed with many excellent plant operators acquainted with difficult production or fluorine compounds.

The company has come to be well known as a fluorine-chemical maker both at home and overseas as illustrated by the increasing number of inquiries it is receiving from abroad. It aims at doubling fluorine-chemical sales to Y20,000 million.

ASAHI CHEM AND IDEMITSU TO LINK UP ON POLYSTYRENE

Asahi Chemical Industry Co., and Idemitsu Petrochemical Co., will soon reach agreement on joint undertaking of polystyrene (PS) business. Negotiations are now underway on detailed points of the plan.

This will be the second Asahi Idemitsu partnership for commodity resins, following their tie-up for propylene business.

Background interests are the wish to receive styrene monomer (SM) material for PS, on a stable basis on the part of Asahi and the desire to expand SM and PS business on the part of Idemitsu. Asahi is Japan's biggest PS producer and is now constructing a 50,000-t/y advanced high-impact PS plant in Chiba, while Idemitsu is a leading supplier of SM and PS.

KANEGAFUCHI TO STREAMLINE VC AND CAUSTIC PLANTS

With the supply-demand situation of vinyl chloride and caustic soda becoming tight, Kanegafuchi Chemical Industry Co. is planning to launch drastic modification and expansion of its Takasago factory beginning from this fiscal year. Under the scheme the company is to scale up an existing VC monomer plant from

320,000 to 420,000 t/y. In addition it intends to streamline a PVC plant and caustic soda electrolysis equipment.

In this fiscal year the company will add 50,000-t/y capacity to that of the VCM plant and modify 50% of the existing PVC plant. The company will also modify its existing caustic soda electrolysis equipment (ID and H1 processes) for the up-to-date ion-exchange membrane process so as to strengthen cost competitiveness. Nearly a half of the company's total investment funds of Y18 billion for fiscal year 1988 will be earmarked for this series of investment projects.

PHTHALIC ANHYDRIDE DEMAND TO BE BRISK IN 1988

The phthalic anhydride industry recently issued a report on production and demand estimates for phthalic anhydride in 1988.

According to the report, production is estimated at 300,000 tons and demand including exports, at 297,000 tons.

Since domestic demand is brisk, however, it is certain that the results of productions and demand will exceed the figures mentioned above.

Regarding production, some manufacturers have postponed periodical inspection and phthalic anhydride plants will mostly be in full operation.

As the background for these estimates, the following details of demand by use has been taken into consideration. Phthalic anhydride for use in plasticizer will register 154,000 tons (3% rise over previous year), paint 25,000 tons (no change), polyester resin 32,000 tons (2% gain), paint/pigments 13,000 tons (no change) and others

28,000 tons (no change). Total domestic demand is estimated at 252,000 tons and exports, at 45,000 tons (20% drop from preceding year) giving a total of 297,000 tons.

Production in 1987 was 307,000 tons. In 1988, however, production is expected to be confined to 300,000 tons because periodical inspection by some manufacturers has been postponed. Thus, production is expected to be at 300,000 tons level for the second consecutive year although phthalic anhydride plants will be in full operation for the most part.

As a result, after July it will be hard to keep the optimum level for inventories and supply will unavoidably be tight.

U.K.'S TIOXIDE STARTS SUBSIDIARY IN KOBE

Tioxide group of the UK, the 2nd largest titanium dioxide maker in the world, established its wholly owned subsidiary, Tioxide Japan, in Kobe as of July 1.

Tioxide is producing about 450,000 tons of titanium dioxide a year, of which about 20,000 tons has been supplied to Japan. With the start of the Japanese subsidiary, the U.K. firm intends to strengthen its technical service to Japanese users in a bid to boost its market share in Japan.

The Japanese subsidiary capitalized at Y95 million is starting with seven employees for the moment and plans to expand this number in future.

PRODUCTION OF ALL MAJOR DRUGS SCORES 2-DIGIT GROWTH

Production of all the major pharmaceutical categories in 1987 attained 2-digit growth according to the statistics compiled by the

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Ministry of Health and Welfare. Antibiotics, top-ranking in share turned to positive growth as compared with the preceding year. In contrast, human blood preparations which have been put under administrative steps for application control suffered a substantial decrease in terms of both production and imports. By use, the production value of prescription products increased 13.5% over the preceding year, and over-the-counter drugs were up 8.6%. As a result, the total production value of the two items showed 12.7% growth.

Production value in the year amounted to Y4,825.4 billion and import was Y355.5 billion, up 7.8%. The overall market scale combined with production and import was Y5,180.9 billion exceeding the 5-trillion level for the first time. Regarding share by production value, prescription products were 85%, up 0.5 of a percentage point; over the counter drugs, 13.2% and household medicine 1.1%.

A breakdown of production and import by pharmatherapeutic category is; antibiotics, up 7.2% (up 7.3% in terms of production); cardiovascular agents, up 14.7% (up 15.3%); central nervous system agents, up 15.0% (14.9%); and gastro-intestinal agents, up 17.2% (up 17.5%). Noteworthy was the advance of the antibiotics which had suffered negative growth before 1988. The advance contributed to the growth of the total market.

In contrast, biological preparations suffered a drop affected by the application control placed on human blood preparations. The production value of blood preparations decreased by 6.6%. Referring to ranking by share, the

ing respiratory organs advanced to ninth place, outpacing act plastic agent. In vitro diagnostic agents advanced in ranking, king a 40% rise.

As for over-the-counter d nutritives, tonics and altern gained 23% because mini-d ing agents were a big hit. In dition diagnostic agents sho a steep rise (4.6 fold) on the length of pregnancy diagn agents.

CHLOROFLUOROCARBON SUBSTITUTE TEST-PRODUCT ASAHI GLASS

Asahi Glass Co. has sta producing Flon 123 (dich fluoroethane) using a 500 t/y semicommercial plant b on inhouse-developed m production technology. Flon is regarded as a promising stitute for Flon 11 — a ch fluorocarbon.

The technology is a spe catalyst-applied liquid-phase cess, which the company has neered on the basis of 20 y of experience in chlorine-de tive production. The comp is the world's first to buil mass-production plant for said product.

It claims that it is possibl scale up the production capa of the plant to 10,000 tons year. It envisages upgrading facility to the point that it is full-scale commercial plant soon as the safety of Flon 12 confirmed.

In a related development, company is operating a p for Flon 134a (tetrafluoroetha a substitute for Flon 12 —

MARKET INFORMATION

Dye Intermediates Up

The Bombay chemicals market experienced a shortage of solvents such as benzene, Xylene and Toluene. Enquiries revealed that the lack of suitable warehousing facilities combined with reluctance on part of manufacturers to supply materials in drums has led to this problem.

The manufacturers of Acetic Acid raised their basic rates by another Rs. 3/- per kg. Butyl Acrylate Monomer is in limelight ruling at Rs. 64/- per kg.

In the Dyes Intermediate section certain varieties—Anthranilic Acid quoting Rs. 65/-; BON Acid Rs. 140/-; J. Acid

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

Rs. 270/-; P.T. Base Rs. 93/- per kg. have all firmed up.

(Prices as on 22nd September 1988)

INDUSTRIAL CHEMICALS	Per kg				
Ammonium sulphate	2.00	Bleaching powder (33% Cl)	4.10	Calcium chloride 36%	
Ammonium phosphate (Mono)	14.50	Borax (Granular)	13.50	(Anhydrous)	5.00
Ammonium phosphate (Di)	12.00	Borax (Powder)	21.00	Calcium Carbonate PPT	3.00
Ammonium carbonate (Di)	17.00	Boric acid (Tech)	22.00	Calcium carbonate (Activated)	3.55
Ammonium bicarbonate	5.60	Bisphenol-A	70+ST	Camphor (Indian)	82.00
Ammonium chloride	3.00	Butyl carbitol	50.00	Cresylic acid	50.00
Ammonium nitrate	8.50	Caustic soda (Flakes)	8.60	Cream of Tartar (Tech.)	70.00
Arsenic white powder	21.00	Caustic soda (Solid)	8.70	Citric acid (Belgium) (Resale)	42.00
Acrylamide (Resale)	61.00	Caustic soda (Lye)	7.00	Citric acid (Indian) (Resale)	42.50
Barium carbonate	6.00	Calcium chloride 70% (Solid)	3.25	Copper sulphate	21.00
		Calcium chloride 75-80%		Chromic acid	48.00
		(fused)	3.50		

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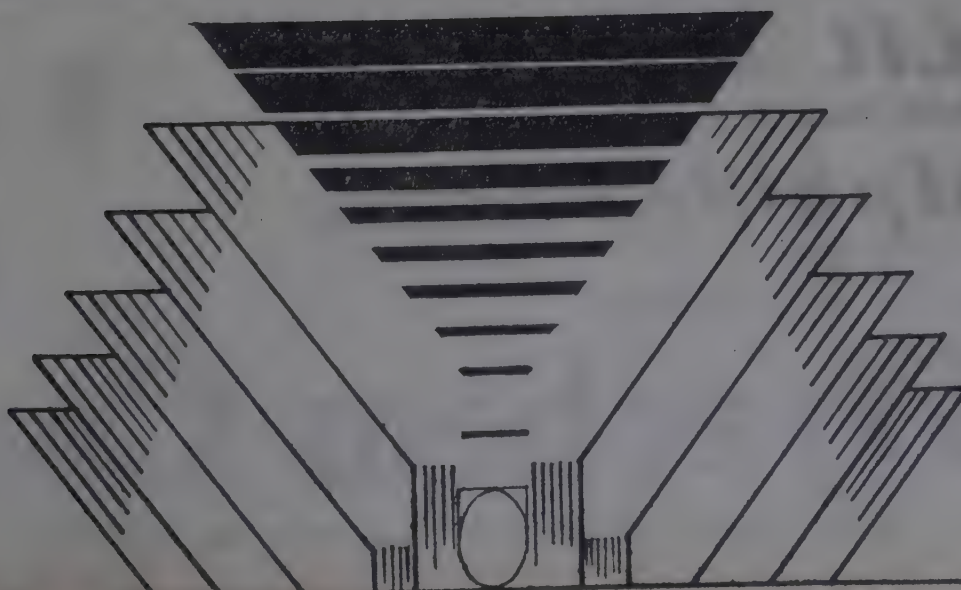
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(Anhydrous)	16.00	Sodium sulphide 50-52%		Benzyl Alcohol	60.00
Glue flakes	8.45	(Flakes)	11+ST	Benzyl chloride	34.00
Glue sheets	6.75	Sodium sulphide 58-60%		Benzo trichloride	16.00
Gohsenol GH-17	130+ST	(Flakes)	(TCL) 19.00	Benzoyl chloride	22.00
Hydro	42.50+ST	Sodium sulphide pure (Flakes)	12.25	Bromine Liquid	55.00
Hyflosupercell	24+ST	Sodium nitrite	(Resale) 680.00	Chloroform	25+ST
Hexamine	(Resale) 40.00	Sodium chloride 80% (Spain)	80.00	Carbon Tetrachloride	17.00
Industrial Wax	25.00	Soda Ash (Tata)	4.10	Cellosolve	47+ST
Litharge	15.00	Soda Ash (Birla)	3.95	Cyclohexanone	50+ST
Lead Acetate (Tech)	28.00	Soda Ash (Imp.)	3.80	Cyclohexanol	52+ST
Lithopone	18+ST	Soda Ash (Imp.)	3.50	Diacetone	(Resale) 35.00
Magnesium chloride (Crystal)	1.00	Sodium bicarbonate	6.00	Diethyl Oxalate	34.00
Menthol crystal (Flakes)	330+Ex.+ST	Sodium bisulphite	4.50	Diethylene glycol (DEG)	43+ST
Menthol bold	365+Ex.+ST	Sodium silicate	3.00	Diethyl Phthalate	52.00
Menthol crystal bold	395+Ex.+ST	Sodium acetate	6.00	Diallyl Phthalate	56.00
Magnesium carbonate (Japan)	16.00	Sodium alginate	160+ST	Dimethyl Phthalate	28.00
Magnesium carbonate (Indian)	15.00	Titanium Dioxide (Anatase)	58+ST	Diethyl Adipate	52.00
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(Resale)	44+ST	(Rutile — RCR ₂)	80+ST	Dipentene	15.00
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(Resale)	130+ST	Acetic Acid (Glacial) (Resale)	19.00	Isopropyl Alcohol	21.00
Polyvinyl alcohol (No. 208)	150.00	Acetic Anhydride (Resale)	28.00	Iso Butyl Alcohol	28.00
Paraformaldehyde (Resale)	23+ST	Acetone (Resale)	17.00		(Resale) 30.00
Phthalic anhydride 36%		Adipic Acid	55+ST	Monoethanolamine	(Resale) 52.00
(Resale)	24.00	Aceto Acetanilide	50.00	Melamine	43+ST
Pentaerythritol	(Resale) 48.00	Aniline Oil	(Resale) 45+ST	Methyl Ethyl Ketone	50.00
Paraffin wax	(Resale) 14.50	Benzoate Plasticiser	45.00	Methyl Isobutyl Ketone	36.00
Rangolite (German)	50+ST	Butyl acrylate	84+ST	Methyl Acrylate	42.00
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N-Methyl Aniline	120.00
Naphthalene (Refined)	23.00
Ortho Anisidine (OA Imp.)	87.00
Ortho Dichloro Benzene (ODCB)	11.25
OO Base	105.00
Para Dichloro Benzene (PDCB)	18.00
Para Anisidine (PA-Imp)	110.00
Para Anisidine (PA-Local)	95.00
PNA	72.00
Para Cresidine (Imp.)	335.00
Para Amino Azo Benzene (India)	150.00
PNCB	33.00
Para Amino Acetanilide	155.00
1-Phenyl 3-methyl-5 Pyrazolone	125.00
Phenyl J. Acid	350.00
Para Amino Benzoic Acid	170.00
PT Base	93.00
Rhoduline Acid	510.00
Resist Salt	22.00
Resorcinol	150.00
Sodium Naphthionate	65.00
5-Sulpho-Anhtranilic Acid	64.00
Sulphanilic Acid	28.00
Sulpho Tobias Acid	120.00
Trichloro Benzene (TCB)	18.00
Tobias Acid	135.00

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(Prices as on 22nd September 1988)

[illegible]

Delhi Market

DELHI: SEPT. 23 (NNS) — Menthol prices recorded a major gain of Rs. 140/175 per kg. in the local chemicals market during last week, on account of negligible stock position and fall in supply from U.P. along with continued heavy despatches to Pakistan, says NNS. Rangolite and titanium dioxide also sought higher level while soda caustic flakes slipped by Rs. 3/5 on improved supply.

Menthol bold recorded gains from Rs. 380 and touched a new peak level of Rs. 550 per kg. in the face of heavy demand shown by the exporters and stockists of Bombay and Delhi and heavy despatches to Pakistan where the commodities were traded at Rs. 650 per kg. Menthol flake and medium advanced sharply by Rs. 140/165 at Rs. 450 and Rs. 520 in same reason. Mentha oil rose sharply from Rs. 250 to Rs. 335 and DMO flared up from Rs. 148 to Rs. 205 on heavy hoarding tendency. It was also stated that the stockists of Sambhalpur, Moradabad, Rampur, Chaudhary and local stockists were keen buyers of mentha and menthol oil.

In the absence of inflow from Kerala coupled with hoarding tendency by stockists, titanium dioxide Anatase fir-

med up by Rs. 3 at Rs. 56.50 per kg. Titanium dioxide RC-822 looked up by Rs. 2 at Rs. 78 on better demand by paint units for forthcoming festival. Chatkolight gained Rs. 3 at Rs. 53/kg, on poor import from China and Germany and dwindling stocks position in the market. Rangolite Germany firmed up by Rs. 2 at Rs. 72 in hope of good demand by gur khandisari markers within some days. Soda hydro sulphite however, drifted lower by Rs. 1.50 at Rs. 39.50 on slack off-take, while Gulshan Damosha and Kalali Hydro ruled static at Rs. 37/42.50 and Rs. 44.50 per kg.

Tartaric acid recorded a sharp gain of Rs. 75 at Rs. 5,950 per 50 kg. followed by bullish advices from Bombay. In the face of reduced inflow from Assam, Paraffin wax firmed up by Rs. 5 at Rs. 670. Sodium nitrite moved up by Rs. 5/10 at Rs. 675/700 followed by hike in prices by manufacturers. Soda bicarb moved up by Rs. 5/6 at Rs. 270/278 on hoarding tendency. Soda ash flared up by Rs. 280/305 on sustained offtake. Ammonia bicarb hovered around at Rs. 135 over the week. Hydrogen peroxide eased by 25 paise. Offtake was poor in dyes and colour.

(DELHI MARKET RATES AS ON SEPTEMBER 23, 1988)

Ammonium Bicarb (per 25 kg)	135.00
Mercury (per flask)	10,800.00
Soda ash (per bag)	280-305.00
Ammonium chloride (per 50 kg)	125-180.00
Caustic soda flakes (per 50 kg)	390-395.00
Citric Acid (per 50 kg)	2000-2500.00
Stable Bleaching Powder Shriram (per 25 kg)	95.00
Stable Bleaching Powder KCI (per 25 kg)	86.00
Stable Bleaching Powder MODI (per 25 kg)	88.00
Sod. Bicarbonate (per 50 kg)	270-278.00
Sod. Hydro Sulphite (per kg)	37-44.50
Rangolite (per kg)	53-72.00

Boric acid Technical (per 50 kg)	1025.00
Paraffin wax (per 50 kg)	670.00
Tartaric acid (per 50 kg)	5,950.00
Borax Granular (per 50 kg)	565.00
Borax Crystal (per 50 kg)	580.00
Sodium Nitrate (per 50 kg)	430.00
Sodium Nitrite (per 50 kg)	675-700.00
Camphor Powder (per kg)	88.00
Camphor Thal (per kg)	100.00
Menthol Medium (per kg)	520.00
Menthol Flakes (per kg)	450.00
Menthol Bold (per kg)	550.00
Glycerine (per kg)	47-48.00
Sodium Silicate (per quintal)	200-250.00
Hexamine (per kg)	32.00

Acetic Acid Glacial (per kg)	18-19.00
Copper Sulphate (per quintal)	2300-2500
Formic acid (per kg)	N.A.
Formaldehyde (per kg)	9.00
Hydrogen Peroxide (per kg)	25.75-29.00
Calcium Carbonate (per tonne)	2500-4000.00
Acid Slurry Soft (per kg)	24.00
Acid Slurry Hard (per kg)	32.00
Phosphoric Acid (per 50 kg)	900.00
Pot. Nitrate (per quintal)	900-1200.00
Pot. Permanganate (per 50 kg)	2300.00
Sod. Bichromate (per 50 kg)	1050-1150.00
Tri-Sod. Phosphate (per 50 kg)	350-380.00
Titanium Dioxide Anatase (per kg)	65.00
Titanium Dioxide RC-822 (per kg)	78.00
Zinc Oxide (per mt)	35,000-42,000.00
Phenol Carbolic Acid (per kg)	33.00
Carbon Tetrachloride (per kg)	20.00
Chloroform (per kg)	28.00
Sodium Sulphate (per 50 kg)	160-180.00
Naphthalene Balls (per 50 kg)	1375.00

DYES & COLOURS (per kg)

Naphthol AS	158.00
Naphthol ASG	249.00
Naphthol ASBS	210.00
Naphthol ASTR	320.00
Naphthol ASOL	202.00
Naphthol ASBO	220.00

DIRECT DYES (per kg)

Black E. Conc.	110-160.00
Diazo Black MT	105-120.00
Green B	100-127.00
Blue 2-B	60-92.00
Sky Blue FB	213.00
Basic Auramine	55-110.00
Basic Rhodamine	220-320.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	140-165.00
Acid Orange	45-88.00

Madras Market

Markets were buoyant with many items fluctuating during the week. Caustic soda flakes prices came down on better availability. Similarly caustic soda lye prices also came down substantially. Sodium cyanide (imported) prices were up on reported world shortage of the material and world market prices going up. Titanium dioxide anatase grade material went up

on increase in prices of local manufacturers. Similarly Rutile material prices ruled high on reported shortages of the material. Phthalic anhydride prices went up consequently pushing up the rates of DOP and DBP substantially. In the solvents section, there has not been much of a change and most items prices remained unchanged.

(MADRAS MARKET RATE AS ON SEPTEMBER 17, 1988)

Acetic Acid Glacial (per kg)	18.75	Hydrosulphite of Soda — TCPL (per kg)	40.00
Aluminium Sulphate Iron Free (per MT)	1800.00	Hydrosulphite of Soda — IDI (per kg)	44.00
Ammonium Bicarbonate (per 25 kg)	125.00	Hydrosulphite of Soda — BASF (per kg)	45.00
Acid Slurry Solt (per kg)	27.00	Hydrogen Peroxide (per kg)	30.00
Ammonium Chloride SPIC (per MT)	2,800.00	Hyflo Supercell (per kg)	24.00
Bleaching Powder (per 25 kg bags)	110.00	Magnesium Carbonate (per kg)	18.00
Borax Granular (per 50 kg)	650.00	Potassium Bichromate (per kg)	26.00
Caustic Soda Flakes — Mettur Chemicals (per MT)	8,400.00	Phosphoric Acid (per kg)	19.00
Caustic Soda Flakes — Andhra Sugars (per MT)	8,200.00	Phthalic Anhydride (per kg)	24.00
Citric Acid (per kg)	45.00	Pentaerythritol (per kg)	52.00
Copper Sulphate (per 50 kg)	1,050.00	Paraffin Wax (per kg)	13.50
Cresylic Acid 98/99% (per kg)	87+ED	Oxalic Acid (per kg)	24.00
Meta Cresol 40/42% (per kg)	39+ED	Soda Ash — TAC (per 75 kg bags)	320.00
Para Cresol 98% (per kg)	67+ED	Soda Ash — TATA (per 75 kg bags)	321.00
Formic Acid (per kg)	27.00	Sodium Cyanide Indian (per kg)	55.00
Formaldehyde (per kg)	9.00	Sodium Cyanide (Degussa) (per kg)	90.00
Glycerine Carbonate (per kg)	52.00	Sodium Bichromate (per kg)	20.00
		Sodium Bicarbonate (per 50 kg bags)	285.00
		Sodium Nitrate (per 50 kg bags)	425.00

Sodium Nitrite (per 50 kg bags)	750.00
Sodium Silicate (per MT)	4500.00
Sodium Sulphate (per MT)	3,500.00
Sodium Sulphide Flakes (per MT)	13,000.00
Sodium Bisulphite (per 50 kg)	4,000.00
Stearic Acid (per kg)	30.00
Trisodium Phosphate (per 50 kg)	340.00
Titanium Dioxide — Indian (Rutile) (per kg)	58.00
Titanium Dioxide — Indian (Rutile) (per kg)	58.00
Urea Tech (per MT)	2800.00
Zinc Oxide (per kg)	34.00
Zinc Chloride Powder (per kg)	13.00
Zinc Sulphate (per MT)	4,500.00
Di-octyl Phthalate (per MT)	45,000.00
Dibutyl Phthalate (per MT)	45,000.00
Hexamine (per MT)	30,000.00

SOLVENTS

Acetone — HOCL — (per kg)	18.75
Acetone — NOCIL — (per kg)	22.00
Diacetone (per kg)	29.00
Diethyl Glycol (per kg)	48.00
Isopropyl Alcohol (per kg)	22.00
Butanol (per kg)	34.00
Benzene — SAIL — (per lit)	18.00
Toluene — SAIL — (per lit)	18.00
Xylene — SAIL — (per lit)	21.00
Phenol — HOCL — (per kg)	29.00
Turpentine (per lit)	13.50
Trichloroethylene — MCIC — (per kg)	24.50
Carbon Tetra Chloride (per kg)	16.00
Chloroform (per kg)	27.00
Methylene Chloride (per kg)	26.00
Methanol (per kg)	11.00
Methyl Ethyl Ketone (per kg)	48.00
Cellosolve (per kg)	52.00
Butyl Acetate (per kg)	40.00
Ethyl Acetate (per kg)	23.00
Triethanolamine (per kg)	24.50
Sorbitol (per kg)	35.00
Cyclohexanone (per kg)	54.00
M.I.B.K. (per kg)	36.00

Dyes Materials Exported

(BOMBAY)

(From 1-4-88 to 30-4-88)

NAVINON DARK BLUE: To Genoa: Indian Dyestuff Ind. Ltd., 2,000 kgs., Rs. 5,20,486.

NAVINON GREY: To Charleston: IDI Ltd., 1,000 kgs., Rs. 3,77,200.

NAVINON NAVY BLUE TRR M/I: To Rotterdam: IDI Ltd., 100 Ltd., 100 kgs., Rs. 28,493.

NAVINON OLIVE: To Genoa: Indian Dyestuff Inds. Ltd., 1,000 kgs., Rs. 1,98,587.

NAVY BLUE: To Dubai: Gum Export Corpn., 1,000 kgs., Rs. 50,500.

OPTICAL WHITENER: To Bangkok: IDI Ltd., 7,000 kgs., Rs. 2,88,250.

OPTICAL WHITENING AGENT: To Genoa: Indian Dyestuff Inds. Ltd., 1,000 kgs., Rs. 68,786; To Monrovia: Balsara Products Ltd., 1,200 kgs., Rs. 3,60,476.

ORGANIC DYESTUFF : To Hong Kong: Jay Chemical Inds., 2,000 kgs., Rs. 2,05,000; Jay Chemical Inds., 2,000 kgs., Rs. 2,05,000.

ORGANIC PIGMENTS: To Aarhus: Sudarshan Chemical Inds., 8,000 kgs., Rs. 6,20,512; To Copenhagen: Sudarshan Chemical Inds., 500 kgs., Rs. 85,351; To Keelung: Sudarshan Chemical Inds., 500 kgs., Rs. 73,260; To Le Havre: Sudarshan Chemical Inds., 500 kgs., Rs. 45,202.86; To Mombasa: Sudarshan Chemical Inds., 450 kgs., Rs. 78,243; To Melbourne: Sudarshan Chemical Inds., 1,100 kgs., Rs. 1,21,235; To Rotterdam: Sudarshan Chemical Inds., Ltd., 500 kgs., Rs. 56,287; To Singapore: Sudarshan Chemical Inds., 1,500

kgs., Rs. 1,51,742; To Toronto: Sudarshan Chemical Inds., 10,250 kgs., Rs. 14,45,672.

PHTHALOCYANINE BLUE: To Melbourne: Sudarshan Chemical Inds., 500 kgs., Rs. 64,897.

REACTIVE BLACK: To Keelung: Priya Electronics & Chemicals Ltd., 3000 kgs., Rs. 2,26,958.

REACTIVE BLACK: To New York: Jansons International: 1,320 kgs., Rs. 1,06,500.

REACTIVE BLACK B: To Barcelona: Karsandas Mavji, 1,000 kgs., Rs. 82,354.

REACTIVE BLACK 5: To Liverpool: Priya Chemicals, 1,000 kgs., Rs. 76,736.

REACTIVE BLUE: To Bangkok: Espee Chemicals, 1,000 kgs., Rs. 91,770; To New York: Jansons International, 2,000 kgs., Rs. 1,57,798.

REACTIVE BLUE 21: To Bangkok: Mohita Dyechem Pvt. Ltd., 1,000 kgs., Rs. 89,122; To Busan: Brinda Export Agencies, 500 kgs., Rs. 43,000; To New York: Jayendra Kumar Hiralal Kharawa, 2,000 kgs., Rs. 1,55,000.

REACTIVE BRILLIANT BLUE CR: To Keelung: Navin Chemical Enterprises, 50 kgs., Rs. 7,600.

REACTIVE BRILLIANT MAGENTA C8 H/C: To Keelung: Navin Chemical Enterprises, 50 kgs., Rs. 4,970.

REACTIVE SUPRA BLACK: To Lagos: Roffee Impex International Pvt. Ltd., 3,250 kgs., Rs. 2,66,366.

REACTIVE SUPRA TURQUOISE BLUE G.: To Lagos: Roffee Impex International Pvt. Ltd., 920 kgs., Rs. 75,402.; To Busan: Karsandas Mavji 1,000 kgs., Rs. 72,177.

REACTIVE TURQUOISE BLUE: To Keelung: Monarch Dyestuffs Inds., 500 kgs., Rs. 42,857.

RED FFG: To Hong Kong: Colour Chem Ltd., 10,875 kgs., Rs. 5,77,115.

RED OXIDE: To Freemantle: Rokadia Chemical Co. Pvt. Ltd., 2,500 kgs., Rs. 11,14,000.

RED OXIDE POWDER: To Port Said: Industrial Minerals Chemical co., 1,00,000 kgs., Rs. 1,03,479.

RHODAMINE B: To Keelung: Karsandas Mavji: 200 kgs., Rs. 64,755.

RHODAMINE B 100% : To Rotterdam: Karsandas Mavji 1,000 kgs., Rs. 50,237.

R. SALT: TO New York: Espee Chemicals, 2,550 kgs., Rs. 80,419.

SOLATIC BRILLIANT PURPLE 2R POWDER: To Jakarta: Atic Industries Ltd., 500 kgs., Rs. 2,57,731.

SUPRA YELLOW: To Melbourne: Jayanth Dye Chem Pvt. Ltd., 2,200 kgs., Rs. 2,81,782.

SYN. COALTAR DYES: To Antwerp: Jaysynth Dyechem Pvt. Ltd., 1,000 kgs., Rs. 1,96,464; Mangalya Trading & Investments 400 kgs., Rs. 73,000.; To Bangkok: Indian Dyestuffs & Chemical Mfg. Co., 1,000 kgs., Rs. 1,36,597; K. Patel Chemo Pharma Pvt. Ltd., 6,000 kgs., Rs. 4,06,900; To Busan: Bhoir Import Export Pvt. Ltd., 500 kgs., Rs. 48,656. Jay Chemi Colour Inds., 800 kgs., Rs. 1,34,338; To Charleston: Jaysynth Dyechem Pvt. Ltd., 1,000 kgs., Rs. 1,53,019; To Chicago: Golden Dyes Corpn., 868 kgs., Rs. 68,900.; To Chittagong: Atic Inds. Ltd., 700 kgs., Rs. 2,00,542.; To Colombo: Mangalaya Trading & Investments, 700 kgs., Rs. 64,500; To Dubai: Jaysynth Dyechem Pvt. Ltd., 300 kgs., Rs. 48,389; To Felixstowe: Kantilal Sanghvi & Co., 500 kgs., Rs. 91,500. To Genoa: Atul Products Ltd.,

33,550 kgs., Rs. 23,67,062; Chemiequip Ltd., 4,300 kgs., Rs. 3,68,401.

SYNTHETIC COALTAR DYES:

To Genoa : Jay Chemie Colour Inds., 1,000 kgs., Rs. 1,50,066; Ravi Chem Dye, 800 kgs., Rs. 72,600; To Hamburg: Bhoir Import Pvt. Ltd., 2,000 kgs., Rs. 1,64,561; Jaysynth Dye Chem Pvt. Ltd., 2,325 kgs., Rs. 5,31,428; To Hong Kong : Bhoir Import Export Pvt. Ltd., 10,500 kgs., Rs. 7,16,447; Chemiequip Ltd., 900 kgs., Rs. 1,65,767; Space International, 1,000 kgs., Rs. 57,667; To Hodeidah : The Atul Products Ltd., 3,500 kgs., Rs. 2,63,749; To Jakarta: Chemiequip Ltd., 500 kgs., Rs. 63,893; Gujarat State Export Corpn. Ltd., 1,000 kgs., Rs. 1,69,000; Indian Dyestuffs Indus. Ltd., 500 kgs., Rs. 34,793; Jindal Dye Intermediate Pvt. Ltd., 1,000 kgs., Rs. 1,46,000; Patel Chemo Pharma Pvt. Ltd., 3,000 kgs., Rs. 1,72,000; Roha Dyechem Pvt. Ltd., 6,000 kgs., Rs. 5,73,000; To Keelung : Jindal Dye Intermediate Pvt. Ltd., 2,000 kgs., Rs. 3,10,000; Navin Chemical Enterprises, 500 kgs., Rs. 40,750; Sanjay Sales Corporation 3Mts., Rs. 1,28,682; Space International, 300 kgs., Rs. 78,833; To Kuwait : Esufali Akbarali & Co., 5,000 kgs., Rs. 30,000; To Lagos : Roffee Impex International Pvt. Ltd., 1,700 kgs., Rs. 1,83,596; Mangalya Trading & Products Ltd., 1,500 kgs., Rs. 1,83,596; Mangalya Trading & Investment, 150 kgs., Rs. 18,500; To Melbourne : Ajay Chemicals : 1,500 kgs., Rs. 22,80,00.; Jayanth Dyechem Pvt. Ltd., 2,200 kgs., Rs. 2,81,782; K. Patel Chemo Pharma Pvt. Ltd., 1,000 kgs., Rs. 71,000; To Mombasa : Roffee Impex Intl Pvt. Ltd., 2,450 kgs., Rs. 2,25,360; To Montreal: Jaysynth Dyechem Pvt. Ltd., 2,000

kgs., Rs. 2,96,405; To New York: Atic Inds Ltd., 7,179 kgs., Rs. 29,83,245; The Atul Products Ltd., 9,500 kgs., Rs. 8,61,332; Bhoir Import Export Pvt. Ltd., 6,000 kgs., Rs. 6,39,777; Gokul Enterprises, 1000 kgs., Rs. 1,64,482; Jaysynth Dyechem Pvt. Ltd., 1,300 kgs., Rs. 1,95,282; Navin Chemical Enterprises, 12,000 kgs., Rs. 6,67,000; To Odessa : The Atul Products Ltd., 39,000 kgs., Rs. 26,32,500; To Penang : Indian Dyestuffs & Chemicals Mfg., 3,500 kgs., Rs. 1,61,081; To Rotterdam : Chemiequip Ltd., 2,575 kgs., Rs. 3,76,143; Geekay Exim Ltd., 1,000 kgs., Rs. 72,624; The Jamshri Ranjetsingh Spg. Mills., 5,000 kgs., Rs. 4,39,856; Jay Chemi Colour Inds., 1,500 kgs., Rs. 2,43,833; Jaysynth Dyechem Ltd., 9,500 kgs., Rs. 15,20,222. To Rotterdam : Navin Chemical Enterprises, 2,000 kgs., Rs. 1,60,000; Shree Dye Chem, 800 kgs., Rs. 91,534; Western Chemical Co. 4,000 kgs., Rs. 4,61,949; To Rijeka : Gujarat State Export Corpn., Ltd., 10,000 kgs., Rs. 6,12,124; To Singapore : Golden Dyes Corpn. Pvt. Ltd., 3,000 kgs., Rs. 1,30,600; Indian Dyestuffs Inds. Ltd., 1,600 kgs., Rs. 70,876; K. Patel Chemo Pharma Pvt. Ltd., 2,000 kgs., Rs. 82,000; Mangalya Trading & Investment, 200 kgs., Rs. 17,500; To Sydney : Chemiequip Ltd., 1,000 kgs., Rs. 1,37,615; To Odessa : Arlabs Ltd., 1,000 kgs., Rs. 41,500.

SYNTHETIC ORGANIC BRIGHTENING AGENT : To Tanjung: Chika Ltd., 4,000 kgs., Rs. 2,68,042.

SYNTHETIC ORGANIC DYES : To Antwerp : Priya Chemicals, 5,000 kgs., Rs. 5,37,680; Vipul Dyes & Chemicals Pvt. Ltd., 4,500 kgs., Rs. 2,32,546; To

Bangkok : Jay Chemicals Inds., 9,800 kgs., Rs. 19,76,907; Karandas Mavji, 1,250 kgs., Rs. 97,724; Sanjay Sales Corpn., 2 Mts., Rs. 1,68,280; To Barcelona : Metro Chem Inds., 100 kgs., Rs. 3,66,972; To Busan : Blue Rock Dyes & Chemicals Pvt. Ltd., 1,000 kgs., Rs. 81,811; Jay Chemical Inds., 2,000 kgs., Rs. 2,53,000; To Chicago : Jay Chemical Inds., 3,000 kgs., Rs. 1,60,00; To Chittagong : Amritlal Chemaux Ltd., 900 kgs., Rs. 3,19,118; Colour-Chem Ltd., 3,300 kgs., Rs. 2,02,959; Jasani Colour Chem Inds., 800 kgs., Rs. 50,400; Ramakem Pvt. Ltd., 250 kgs., Rs. 17,880.15; To Colombo : Karandas Mavji : 1,250 kgs., Rs. 58,715; Star Enterprises : 750 kgs., Rs. 1,01,079; To Felixstowe: Amritlal Chemaux Ltd., 3,000 kgs., Rs. 9,54,086; Kantilal Sanghvi & Co., 500 kgs., Rs. 91,500; To Genoa : Arlabs Ltd., 1,500 kgs., Rs. 1,41,391; To Genoa : Chika Ltd., 1,000 kgs., Rs. 1,35,567; Metro Chem Ind. 6,400 kgs., Rs. 5,50,449; Priya Chemicals, 1,500 kgs., Rs. 2,90,077; Priya Electronics & Chemicals 1,000 kgs., Rs. 1,23,819; To Hamburg : Associated Intermediates & Chemicals, 2000 kgs., Rs. 2,80,000; To Hong Kong : Jayendrakumar Hiralal, 2,000 kgs., Rs. 1,94,000; Kabbur Inds. Pvt. Ltd., 2,000 kgs., Rs. 2,50,852; To Jakarta : Espee Chemicals, 5000 kgs., Rs. 4,36,697; To Keelung : Amar Dye Chem Ltd., 800 kgs., Rs. 1,15,519.

SYNTHETIC ORGANIC DYES-TUFF : To Keelung : Brinda Export Agencies., 1,000 kgs., Rs. 1,09,000; Chika Ltd., 500 kgs., Rs. 35,715; Indokem Ltd., 800 kgs., Rs. 1,84,214; Jay Chemical Industries, 3,000 kgs., Rs. 3,74,000; Little & Co., 200 kgs., Rs.

65,530; Space International 2,000 kgs., Rs. 1,93,971; To Kobe: Blue Rock Dyes & Chemicals, 1,100 kgs., Rs. 97,963; To Leghorn: K. Mavji, 3,000 kgs., Rs. 5,33,158; To Liverpool: Karsandas Mavji, 5,480 kgs., Rs. 3,52, Rs. 69,231; To London: Priya Electronics & Chemicals, 1000 kgs., Rs. 1,29,061; To Melbourne: Priya Chemicals, 1500 kgs., Rs. 2,20,197; To Mombasa: Uni Impex India: 500 kgs., Rs. 1,21,008; To New York: Amar Dye Chem Ltd., 500 kgs., Rs. 74,450; To Anil Industries, 485 kgs., Rs. 50,000; Atic Inds. Ltd., 2108 kgs., Rs. 10,82,474; Avarni Dye Chem Inds., 3,000 kgs., Rs. 2,15,600; Chemosol Industries, 2000 kgs., Rs. 3,05,000; Indokem Ltd., 2,000 kgs., Rs. 1,79,381; Priya Chemicals, 14,000 kgs., Rs. 10,96,724; Rushi Sales, 2,000 kgs., Rs. 3,30,000; Sahyadri Dyestuff Chemicals, 3,650 kgs., Rs. 4,60,000; Sanjay Sales Corpn., 6 MTs., Rs. 2,78,424; Uni Impex India; 1,020 kgs., Rs. 3,48,969; To Odessa: Amar Dye Chem Ltd., 1000 kgs., Rs. 19,500; Amritlal Chemaux Ltd., 19,750 kgs., Rs. 7,66,500; Usha Intercontinental (India) 33,000 kgs., Rs. 42,96,000; Vipul Dyes & Chemicals Pvt. Ltd., 5000 kgs., Rs. 2,15,000; To Piraeus: Chika Ltd., 2,200 kgs., Rs. 1,01,546; Vipul Dyes & Chemicals Pvt. Ltd., 3000 kgs., Rs. 2,19,226; To Rotterdam: Indokem Ltd., 3,000 kgs., Rs. 2,16,972; Jay Chemical Industries, 1,000 kgs., Rs. 57,000; Priya Chemicals, 3,000 kgs., Rs. 1,79,134; Priya Electronics & Chemicals, 500 kgs., Rs. 77,851; Sanjay Sales Corpn., 200 MTs., Rs. 24,500; Vipul Dyes & Chemicals Pvt. Ltd., 2,500 kgs., Rs. 2,28,130; To Singapore: Amritlal Chemaux Ltd., 1,500 kgs., Rs. 1,28,123; To Singapore

Kabbur Inds. Pvt. Ltd., 1,000 kgs., Rs. 93,775; Little & Co, 1,000 kgs., Rs. 77,326; To Tanjung: Chika Ltd., 1,000 kgs., Rs. 85,374; To Tema: Harkab Holding Pvt. Ltd., 750 kgs., Rs. 1,25,000; To Geneva: Sanjay Sales Corpn., 6 MTs., Rs. 7,19,151; Sanjay Sales Corpn., 1,015 MTs., Rs. 1,05,217; To Singapore: Sanjay Sales Corporation., 500 MTs., Rs. 57,850.

SYNTHETIC YELLOW IRON OXIDE: To Melbourne: Sudarshan Chemicals Inds. Pvt. Ltd., 9,000 kgs., Rs. 1,09,047.

TURQUOISE BLUE: To Melbourne: Jaysynth Dychem Pvt. Ltd., 2,200 kgs., Rs. 2,81,782.

TURQUOISE BLUE BG: To Keelung: Navin Chemical Enterprises; 50 kgs., Rs. 4,600.

TURQUOISE BLUE HA H/C: To Hong Kong: Jay Chemical Inds., 1,000 kgs., Rs. 1,25,000.

ULTRAMARINE BLUE: To Abidjan: Eastman Industries, 9,000 kgs., Rs. 4,10,000; To Chittagong: CMC India, 30 kgs., Rs. 2,23,500; To Colombo: CMC India: 5000 kgs., Rs. 51,700; To Freetown: R.S. Mehta & Co. Pvt. Ltd., 2,592 kgs., Rs. 30,927.

VAT BROWN BR: To Bangkok: Indian Dyestuff Inds. Ltd., 1,000 kgs., Rs. 2,30,900.

VAT GREEN: To Bangkok: Gujarat State Export Corpn. Ltd., 500 kgs., Rs. 2,01,000.

VAT OLIVE OMH: To Bangkok: Indian Dyestuffs Inds. Ltd., 12,241 kgs., Rs. 2,76,500.

MATERIALS IMPORTED

MADRAS

(From 1.5.88 to 30.5.88)

ACETYL CHLORIDE: From FRG: Chandra Pharmaceutical Ltd., 43,320 kgs., Rs. 8,53,956; Cheminor Drugs Pvt. Ltd., 86,640 kgs., Rs. 16,56,804.

ACETYL ISO EUGENOL: From France: N. Ranga Rao & Sons., 25 kgs., Rs. 8,075.

ACID CASEIN TECH: From New Zealand: Quinn India Ltd., 25,000 kgs., Rs. 10,65,097.

ACRYLAMIDE: From USA: Christian Medical College & Hospital, 9.5 kgs., Rs. 2,587.

ALCOHOL: From Netherlands: India Crafts, 40,800 kgs., Rs. 2,85,735.

ALDEHYDE C-8: From Switzerland: Bush Boake Allen (I) Ltd., 30 kgs., Rs. 6,601.

ALDEHYDE C-9: From Switzerland: Ambica Chemical Products 850 kgs., Rs. 3,45,026; The Mysore Agarbathi's Mfg. Cop. Soc. Ltd., 200 kgs., Rs. 73,230.

ALDEHYDE C-12: From FRG: The Mysore State Agarbathi Manf. Co.op Society Ltd., 150 kgs., Rs. 57,064.

ALDEHYDE C-18: From Switzerland: Bush Boake Allen (I) Ltd., 5 kgs., Rs. 1,913.

ALKYL METHACRYLATE: From Japan: Addison Paints & Chemical Ltd., 180 kgs., Rs. 15,070.

ALKYL CAPROATE: From UK: N. Ranga Rao & Sons., 175 kgs., Rs. 27,580.

ALPHA OLEFIN SULPHONATE: From France: Chemicals & Plastics India Ltd., 36,000 kgs., Rs. 3,80,099.

ALPHA PHENYL GLYCINE CHLORIDE: From Netherlands: ABS Ltd., 4,025 kgs., Rs. 13,27,018.

ALUMINIUM CHLOROHYDRATE: From UK: Kaveri Engg. Inds. Ltd., 5 Ltd., Rs. 122.

ALUMINIUM NITRATE: From Japan: W. S. Insulators India Ltd., 10 kgs., Rs. 4,534.

AMINO ACIDS: From Japan: Tablets (India) Ltd., 595 kgs., Rs. 2,50,723.

AMINO GUANIDINE BICARBONATE: From Japan: Hindustan Photo Films Mfg. Co. Ltd., 500 kgs., Rs. 55,075.

AMMONIUM ADIPATE: From FRG: Bhaaradwaj Electro Comp. P. Ltd., 200 kgs., Rs. 17,906.

AMMONIUM DIHYDROGEN PHOSPHATE: From FRG: Bhaaradwaj Electro Comp. Pvt. Ltd., 50 kgs., Rs. 6,919.

AMMONIUM PENTABORATE: From FRG: Bhaaradwaj Electro Comp. Pvt. Ltd., 200 kgs., Rs. 16,278.

AMMONIUM PERSULPHATE: From FRG: I. E. L. Ltd., 4,000 kgs., Rs. 65,950.

AMMONIUM THIOCYANATE: From Belgium: Hindustan Photo Films Mfg. Co. Ltd., 10 kgs., Rs. 500.

AMPICILLIN SODIUM STERILE BP: From Spain: Tamilnadu Dadha Pharm Ltd., 150 kgs., Rs. 2,33,399.

AROMATIC CHEMICALS: From France: Agaroma, 400 kgs., Rs. 57,643; Bush Boake Allen Ltd., 400 kgs., Rs. 83,361; Vasu Agarbathies 500 kgs., Rs. 60,416; Vinarm Pvt. Ltd., 27 kgs., Rs. 12,180; From FRG: Bush Boake Allen Ltd., 2,400 kgs., Rs. 1,00,897; N. Ranga Rao & Sons., 2,040 kgs., Rs. 60,416; Bush Boake Allen (I) Ltd., 608 kgs., Rs. 77,685; N. Ranga Rao & Sons., 1,816 kgs., Rs. 3,98,194.

Sankranthi Agarbathi Co., 250 kgs., Rs. 39,571; From Netherlands: Andhi Agarbathis, 325 kgs., Rs. 50,586; Bush Boake Allen (I) Ltd., 36 kgs., Rs. 18,702; From Singapore: Aravinda Parimala Works, 3,960 kgs., Rs. 99,104; From Sweden: The Mysore Agarbathi Mfr. Co-op. Soc. Ltd., 625 kgs., Rs. 2,02,564; 314.2 kgs., Rs. 2,08,486; From UK: Bush Boake Allen I Ltd., 2898 kgs., Rs. 2,45,327; From USA: M. Muddanna & Sons, 181 kgs., Rs. 17,667; Shalimar Agarbathi Co., 4,572 kgs., Rs. 1,11,564; Sri Amar Trading Co., 363 kgs., Rs. 38,687.

BENZALDEHYDE: From Netherlands: Malladi Drugs & Pharmaceuticals Ltd., 31,200 kgs., Rs. 8,80,332.

BENZYL DIMETHYLAMINE: From UK: SIP Resins Ltd., 2,160 kgs., Rs. 1,33,735.

BETA HYDROXY ETHYL HYDRAZINE: From Netherlands: Es-kayef Limited, 5000 kgs., Rs. 5,14,412.

BETA PICOLINE: From Japan: Veer Chemie & Aromatic Pvt. Ltd., 10,070 kgs., Rs. 4,09,729.

BORAN TRIFLUORIDE: From Japan: McDowell & Co. Ltd., 1,050 kgs., Rs. 2,25,461.

BUTANE DIOL: From FRG: Indian Space Research Organisation 420 kgs., Rs. 16,313.

BUTACHLOR TECHNICAL: From USA: Agrochemical Inds., 34,920 Lbs., Rs. 6,19,502; Coromandel Indag Products (P) Ltd., 31,680 kgs., Rs. 12,52,822; Tropical Agrosystems Pvt. Ltd., 15,872 kgs., Rs. 6,26,411.

BUTACHLOR TECH 92%: From USA: Tropical Agrosystems Pvt. Ltd., 34,920 Lbs., Rs. 6,26,411.

BUTYRALDEHYDE ANILINE: From USA: Anabond Pvt. Ltd., 400 kgs., Rs. 29,678.

BUTYLGLYCIDYL ETHER: From Japan: SIP Resins Ltd., 1,080 kgs., Rs. 57,865.

BUTYRIC ACID: From FRG: Bush Boake Allen (I) Ltd., 5,000 kgs., Rs. 1,17,842.

CALCIUM SILICIDE: From FRG: Vishveswaraya Iron and Steel Ltd., 15,000 kgs., Rs. 2,59,973.

CARBOFURAN: From USA: Rallis India Ltd., 9,000 kgs., Rs. 14,94,563.

CELLULOSE ACETATE: From FRG: Kothari Electronics & Inds. Ltd., 2,300 kgs., Rs. 4,11,737.

CETYL ACETATE: From Switzerland: Bush Boake Allen (I) Ltd., 60 kgs., Rs. 18,655.

3-CHLORO-4 FLUORO ANILINE: From Japan: Benex Labs Ltd., 1,000 kgs., Rs. 3,52,010.

CINNAMIC ALDEHYDE: From FRG: Karnataka Soaps & Detergents Ltd., 300 kgs., Rs. 41,473; The Mysore State Agarbathi Mfg. Co-op. Soc. Ltd., 2,000 kgs., Rs. 1,05,275.

CIS-3-HEXENYL 3 METHYLBUTANOTE: From UK: Bush Boake Allen (I) Ltd., 0.50 kgs., Rs. 982.

CITRIC ACID MONOHYDRATE: From China: Esel International 16,000 kgs., Rs. 2,68,002.

CYCLOHEXANONE: From FRG: The Agrochemical Inds., 46 kgs., Rs. 7,68,213; From Netherlands: Agro Chemical Inds., 16,614 kgs., Rs. 2,75,935; E.I.D. Parry (I) Ltd., 16,614 kgs., Rs. 2,75,935; The Scientific Fert. Co., 16,614 kgs., Rs. 2,85,790; Siris India Ltd., 66,456 MT., Rs. 11,03,738.

CYCLOSPORIN: From USA: Dr. Bali Pharma Foundation 5 Lbs., Rs. 23,014.

CYSTEAMINE HYDROCHLORIDE: From Japan: I.E.C. Chemitech (P) Ltd., 300 kgs., Rs. 39,571.

D-ALPHA PHENYL GLYCINE: From Switzerland: TTK Chemicals Ltd., 1,000 kgs., Rs. 1,80,045.

D-PARA HYDROXY PHENYL GLYCINE: From Singapore: TTK Chemicals Ltd., 1,000 kgs., Rs. 2,44,016.

DESMODUR: From FRG: Cut fast Abrasive Tools Ltd., 30 kgs., Rs. 6,566; From USA: Chemguard Coatings Pvt. Ltd., 880 Lbs., Rs. 44,947.

DESMODUR T 80: From Belgium: Auro Foam Pvt. Ltd., 18,000 kgs., Rs. 5,03,332; Swastik Foam Pvt. Ltd., 18 MT, Rs. 5,03,332; From FRG: Joy Foam Pvt. Ltd., 18,000 kgs., Rs. 5,03,332.

3,4 DIAMINE BENZOPHENONE: From Belgium: Pradeep Drug Company, 500 kgs., Rs. 2,28,470.

DIAMYLAMINE: From USA: Chemguard Coatings Pvt. Ltd., 33 Lbs., Rs. 2,287.

DIBUTYL PHTHALATE: From UK: Eskayef Ltd., 50 kgs., Rs. 15,974.

DIETHYLENE GLYCOL: From USA: Standard Organics Ltd., 1,560 kgs., Rs. 72,018.

DIMETHYLACTRONOL: From USA: Aromatic (India), 177 kgs., Rs. 16,226.

DIMETHYLAMINO ETHANOL: From USA: Chemguard Coatings Pvt. Ltd., 442 Lbs., Rs. 8,524.

DIMETHYL ANTHRANILATE: From Switzerland: Bush Boake Allen (I) Ltd., 1 kg., Rs. 178.

DIMETHYL BENZYL CARBINOL: From FRG: Aromatic, 25 kgs., Rs. 7,217.

DIMETHYL SULPHOXIDE: From Japan: Inyenta Chemicals Pvt. Ltd., 15,840 kgs., Rs. 3,58,466; From USA: Standard Organics Ltd., 15,960 kgs., Rs. 3,68,398.

DIMETHYL TEREPHTHALATE: From USA: Indian Organic Chemicals Ltd., 2000 mts., Rs. 1,51,98,322.

DIPHENYL METHANE DI ISOCYANATE: From Belgium: Urethanes India Pvt. Ltd., 25,650 kgs., Rs. 8,62,720.

DL-METHIONINE: From France: K.R.V. Agencies., 1,000 kgs., Rs. 38,648; From Japan: Mysore Feeds Pvt. Ltd., 3,000 kgs., Rs. 1,18,711.

EIPICHLOROHYDRIN: From Japan: Ramkamal Labs., 3,000 kgs., Rs. 1,18,711.

EIPICHLOROHYDRIN: From Japan: Ramkamal Labs., 3,600 kgs., Rs. 87,846.

ETHANE: From Japan: Electronics Research Pvt. Ltd., 17 Boxes Rs. 9,791.

ETHOXY METHYL MALONIC ESTER: From France: Benzex Labs., Ltd., 3,060 kgs., Rs. 4,62,342.

ETHYL AMINO ETHANOL: From USA: Chemguard Coatings Pvt. Ltd., 447 Lbs., Rs. 11,786.

ETHYL BENZENE: From UK: I.E.L. Ltd., 13,650 kgs., Rs. 1,75,653.

ETHYL CYANO ACETATE: From Japan: Benzex Labs., Ltd., 400 kgs., Rs. 47,907.

ETHYL FORMATE: From FRG: Tamilnadu Dadha Pharm. Ltd., 1,080 kgs., Rs. 44,416.

ETHYL VANILLIN: From UK: Madras Snack & Diets Pvt. Ltd., 50 kgs., Rs. 22,923.

ETHYLENE GLYCOL: From FRG: Electronics Corpn. of Tamil Nadu Ltd., 3,740 kgs., Rs. 70,289; Keltron Component Complex Ltd., 4,840 kgs., Rs. 88,042.

FERRIC OXIDE: From Japan: Hilversum Electronics., 2,000 kgs., Rs. 25,635.

FORMIC ACID: From FRG: Coastal Tanners, 4,025 kgs., Rs. 30,798.

FORMIC ACID 85%: From Germany: 10,080 kgs., Rs. 78,442.

FLUOBORIC ACID: From Taiwan: Rao Insulating Co. Ltd., 3,960 Lbs., Rs. 48,523.

FURALDONE HCL MONOHYDRATE: From Netherlands: Eskayef Ltd., 1,000 kgs., Rs. 2,05,621.

GALLIC ACID MONOHYDRATE: From Japan: Inyenta Chemicals Pvt. Ltd., 10 Mts., Rs. 8,38,887.

GAMMA FERRIC OXIDE: From Singapore: Prakash Pipes & Industries Ltd., 12 Mts., Rs. 10,72,283.

GUAICOL ACETATE: From Switzerland: Bush Boake Allen (P) Ltd., 15 kgs., Rs. 7,605.

GUM BENZOIN: From Indonesia: Bharat Indl. Corpn., 520 kgs., Rs. 27,435; Damodhar & Co., 262 kgs., Rs. 15,514; Mysore Anand Dhoop Factory, 500 kgs., Rs. 28,029; From Singapore: Pradhan Perfumers, 172 kgs., Rs. 4,538; Union Trading Co., 839 kgs., Rs. 11,399.

HEXAMETHYLENE DIAMINE: From UK: I.E.L., 3004 kgs., Rs. 96,255.

1,6 HEXANEDIOL: From FRG: Urethanes India Ltd., 1000 kgs., Rs. 58,169.

HEXENOL: From Switzerland: Bush Boake Allen (I) Ltd., 5 kgs., Rs. 7,366.

HYDROXYETHYL CELLULOSE: From USA: CDC Carboline (I) Pvt. Ltd., 163.2 kgs., Rs. 14,988.

HYDROGEN PEROXIDE: From Spain: Polychem Products, 5,100 kgs., Rs. 46,416; Polymer Chemicals, 12,000 kgs., Rs. 1,09,214; From USA: Bharat Electronics Ltd., 1,159 kgs., Rs. 41,557.

HYDROSULPHITE CONC: From FRG: All Chems: 20,000 kgs., Rs. 2,19,748.

HYDROXYLAMINE SULPHATE: From FRG: Adithya Organics Pvt. Ltd., 10,000 kgs., Rs. 2,72,855; Standard Organics Ltd., 90,000 kgs., Rs. 23,48,926.

HYDROXYLAMINE SULPHATE: From Japan: Standard Organics Ltd., 17,500 kgs., Rs. 4,82,521; From Netherlands: Dakshin Pharmaceuticals Ltd., 20,000 kgs., Rs. 5,42,098; Vani Organics Pvt. Ltd., 20,000 kgs., Rs. 5,35,058; From Switzerland: Indo-Dilmun Chem Pharma Ltd., 18 kgs., Rs. 4,84,022.

IODINE CRUDE: From Japan: Eskayef Ltd., 3,000 kgs., Rs. 7,36,257; From USA: Audio Electronics Co. Pvt. Ltd., 58 lbs., Rs. 450.

ISOBORNYL METHOXY CYCLOHEXANONE: From Japan: Kangsugandh Agarbathies, 250 kgs., Rs. 35,463.

ISOBUTYL BENZENE: From UK: Cheminor Drugs Pvt. Ltd., 41,040 kgs., Rs. 16,84,044.

ISO EUGENOL: From France: N. Ranga Rao & Sons., 500 kgs., Rs. 68,549.

ISOPENTANE: From FRG: McDowell & Co., 29.25 MT, Rs. 4,27,968.

ISOPROPYL ALCOHOL: From Japan: Electronic Research Pvt. Ltd., 184 kgs., Rs. 7,375; From Taiwan: Chandra Pharmaceuticals Ltd., 76,800 kgs., Rs. 6,55,092; Medchl Chemicals & Pharmaceuticals Pvt. Ltd., 12,800 kgs., Rs. 1,14,806; Shasun Drugs, 12,800 kgs., Rs. 1,10,501.

L-GLUTAMIC ACID: From France: Pharman Laboratories, 500 kgs., Rs. 32,578.

L-HISTIDINE: From Japan: Tablets (India) Ltd., 35 kgs., Rs. 18,697.

L-LYSINE MONOHYDROCHLORIDE: From Japan: SKM's Energy Animal Feeds Pvt. Ltd., 200 kgs., Rs. 87,056.

LABORATORY CHEMICALS: FROM FRG: Astra Research Centre, 0.5 kgs., Rs. 17,375; Indian Telephone Inds. Ltd., 3,565 kgs., Rs. 8,972.

LAB CHEMICALS: From USA: Kasturba Medical College, 12 Lbs., Rs. 14,960.

LILIAL: From Sweden: The Mysore Agarbathi Manf. Co-op. Soc. Ltd., 600 kgs., Rs. 1,63,353.

LINALYL ACETATE: From USA: Sri Amar Trading Co., 363 kgs., Rs. 38,687.

2-MERCAPTO BENZEIMIDZOLE: From Japan: Shriram Fibres Ltd., 1750 kgs., Rs. 2,69,098.

META CRESOL 97%: From Japan: Maschmeijer Aromatics (India) 16,000 kgs., Rs. 5,90,914.

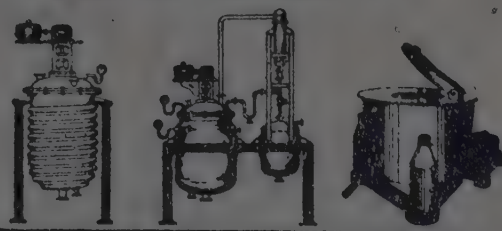
2,6 META XYLIDINE: From Japan: Astra IDL Ltd., 1,400 kgs., Rs. 1,60,346.

METHYL ACETO ACETATE: From Japan: Siris Ltd., 16 MT, Rs. 3,03,054; From USA: Shasun Drugs, 16,926 kgs., Rs. 3,00,548.

METHYL BETA NAPHTHYL KETONE: From Switzerland: Bush Boake Allen (I) Ltd., 20 kgs., Rs. 8,610.

METHYL ETHYL KETONE: From Netherlands: Bhatia's Overseas Exports, 12,480 kgs., Rs. 1,31,589; Dass Carpets Pvt. Ltd., 5,940 kgs., Rs. 66,596; M.P. Oil Extraction Pvt. Ltd., 13.2 MTs, Rs. 1,26,228; From Singapore: Chemcrown Ltd., 6,270 kgs., Rs. 70,297; Extraction Pvt. Ltd., 6,600 kgs., Rs. 63,114; G.N. Aslam, 6,270 kgs., Rs. 70,297; M.P. Oil Extractions Pvt. Ltd., 26,274 kgs., Rs. 2,51,251; From USA: Wagan & Co., 26,400 kgs., Rs. 2,82,006.

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METHYL ISO THIOCYANATE:

From France: Globe Organics Pvt. Ltd., 2,600 kgs., Rs. 4,50,-267.

METHYL OCTINE CARBONATE:

From Switzerland: Bush Boake Allen (I) Ltd., 2 kgs., Rs. 3,300.

N-BENZYL TERTIARY BUTYLAMINE:

From UK: Astra Industrial Ltd., 540 kgs., Rs. 1,19,328.

N-BUTANOL:

From USA: Chennai Inorganics Ltd., 30,080 kgs., Rs. 3,53,113.

N-BUTYL METHACRYLATE:

From Japan: Addison Paints & Chemicals Ltd., 180 kgs., Rs. 6,220.

NAPHTHALENE CRUDE:

From Canada: Chennai Inorganics Ltd., 15,000 kgs., Rs. 1,08,818.

NEOPENTYL GLYCOL:

From FRG: Shasun Drugs, 10 MTS., Rs. 2,36,475; Urethanes India Ltd., 1,000 kgs., Rs. 23,743.

NITROMETHANE:

From USA: Cheminor Drugs Pvt. Ltd., 2,268 kgs., Rs. 1,66,388.

NORMAL PARAFFIN:

From Japan: Tamil Nadu Petroproducts Ltd., 1,948.142 MTS., Rs. 1,19,93,181.

PARACHLOROPHENOL:

From USA: IEL Ltd., 2,000 kgs., Rs. 84,416.

PARAFORMALDEHYDE:

From FRG: Bond Chemicals Corpn., 9990 kgs., Rs. 50,290.

PARAHYDROXY ACETOPHENONE:

From FRG: Newland Labs Ltd., 1,500 kgs., Rs. 3,18,-600.

PARATERTIARY BUTYL PHENOL:

From Japan: Reichhold Chemicals India Ltd., 5,000 kgs., Rs. 87,997.

PENTAERYTHRITOL:

From Japan: IDL Chemicals Ltd., 35,000 kgs., Rs. 7,42,730.

PHENOL:

From Japan: Indian Syntons Pvt. Ltd., 48,000 kgs., Rs. 6,14,128.

PHENYL ACETALDEHYDE:

From FRG: Aromatik, 25 kgs., Rs. 5042.

PHENYL ACETALDEHYDE 50%:

From Switzerland: Bush Boake Allen (I) Ltd., 20 kgs., Rs. 5,549.

PHENYL DIMETHYL ACETALDEHYDE:

From Switzerland: Bush Boake Allen (I) Ltd., 10 kgs., Rs. 3,731.

PHOSPHONO BUTANE:

From FRG: Chemicals & Plastics of India Ltd., 2,000 kgs., Rs. 95,697.

PHOSPHORIC ACID:

From Morocco: Madras Fertilizers Ltd., 6,199 mts., Rs. 3,15,04,936; From USA: Madras Fertilizers Ltd., 15,34,533 kgs., Rs. 77,97,-844.

PHOSPHOROUS PENTACHLORIDE:

From FRG: Escorts Ltd., 2,940 kgs., Rs. 2,32,749.

PIVALOYL CHLORIDE:

From France: TTK Chemicals Ltd., 1,980 kgs., Rs. 1,29,006.

POTASSIUM FLUORIDE PURIFIED:

From FRG: Cheminor Drugs Pvt. Ltd., 2.5 kgs., Rs. 250.

POTASSIUM PERSULPHATE:

From FRG: Prasad Productions Pvt. Ltd., 1,500 kgs., Rs. 28,689.

PROPIONIC ACID:

From FRG: Bush Boake Allen (I) Ltd., 1,050 kgs., Rs. 16,816.

PROPOXYLATED BISPHENOL:

From Netherlands: Naphtha Resins & Chemicals, 4,000 kgs., 2,12,615.

PROPYLENE GLYCOL:

From Singapore: Universal Polymers, 8,600 kgs., Rs. 1,00,956; From USA: Naphtha Resins & Chemicals Ltd., 17,200 kgs., Rs. 1,181,-495.

PROPYLENE GLYCOL USP:

From Singapore: Bush Boake Allen (I) Ltd., 17,200 kgs., Rs. 1,92,839; From USA: Eskayef Ltd., 17.2 mts., Rs. 1,87,167;

Universal Polymers, 17,200 kgs.

Rs. 2,01,912.

PYRIDINE:

From Belgium: I.E.L. Ltd., 15,200 kgs., Rs. 7,13,739; From USA: I.E.L. Ltd., 30,400 kgs., Rs. 14,27,479.

RANGOLITE-C:

From Czechoslovakia: M. Bilal Husain & Co., 12,000 kgs., Rs. 1,81,152.

SODIUM BROMIDE:

From Switzerland: Interchem Pvt. Ltd., 350 kgs., Rs. 42,560.

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From Taiwan: Tac Insulating Co. Ltd., NA kgs., Rs. 1,630.

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From Japan: NGEF Ltd., 780 kgs., Rs. 1,05,047.

STYRENE MONOMER:

From Japan: Emkay Indl. Corpn., 28.8 mts., Rs. 3,60,880.

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From FRG: Maschmeijer Aromatics (I) Ltd., 10,090 kgs., Rs. 2,21,660; Tamil Nadu Dadha Pharmaceuticals Ltd., 3,100 kgs., Rs. 69,875.

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From Belgium: Standard Organics Ltd., 1,080 kgs., Rs. 65,685; TPS Laboratories Pvt. Ltd., 270 kgs., Rs. 19,218.

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From FRG: Maschmeijer Aromatics (I) Ltd., 14,000 kgs., Rs. 4,90,749.

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From USA: I.E.L. Ltd., 1,360 kgs., Rs. 1,76,541.

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From Singapore: Prakash Pipes & Inds. Ltd., 13,063 kgs., Rs. 3,98,146.

TOLUENE: From France: Hindustan Fluorocarbons Ltd., 1.5 kgs., Rs. 269; From UK: Hindustan Aeronautics Ltd., 10,876 mts., Rs. 4,88,914.

TRICHLOROETHANE : From Singapore: Indian Telephone Industries Ltd., 4,590 kgs., Rs. 51,738.

TRIMETHOXY BENZALDEHYDE: From France: Coastal Pharma Chemicals, 2,000 kgs., Rs. 6,96,435.

3, 4, 5-TRIMETHOXY BENZALDEHYDE: From FRG: Prasad Drugs Pvt. Ltd., 3 mts., Rs. 9,29,898; From Netherlands: Inventa Chemicals Pvt. Ltd., 15,000 kgs., Rs. 43,60,629; Prasad Drugs P. Ltd., 3,000 kgs., Rs. 9,35,834.

TRIPHENYLENE PHOSPHATE: From UK: Hindustan Photofilms Mfg. Co., 20 kgs., Rs. 8,85,660.

VANILLIN: From France: Kwality Biscuits Pvt. Ltd., 450 kgs., Rs. 82,873.

VANILLIN TECH: From France: Dr. Reddy's Laboratories Ltd., 42 mts., Rs. 71,29,744.

VETIVEROL: From Switzerland: Bush Boake Allen (I) Ltd., 10 kgs., Rs. 67,922.

ZIRCONIUM OXIDE: From USA: Directorate of Purchases & Stores, 10 nos., Rs. 24,521.

ZINC STEARATE: From UK: Sundaram Fastners Ltd., 500 kgs., Rs. 13,354.

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(From 1.5.88 to 31.5.88)

AMPICILLIN SODIUM STERILE: From Spain: Armour Pharmaceuticals Pvt. Ltd., 50 kgs., Rs. 79,371.

AMPICILLIN TRIHYDRATE: From Hong Kong: Alfred Bere & Co. India Pvt. Ltd., 135 kgs., Rs. 1,18,545.

BENZTHIAZIDE USP: From Italy: Eskayef Ltd., 100 kgs., Rs. 2,16,944.

CHLORPHENIRAMINE MALEATE: From Japan: Medopharm, 50 kgs., Rs. 31,324.

CHOLESTEROL USP: From Japan: Dalpro International, 700 kgs., Rs. 3,47,396.

CYANAMIDE 1500 50%: From FRG: Eskayef Ltd., 1,000 kgs., Rs. 35,795.

DIPHENYLPYRAZINE HCL BP: From USA: Eskayef Ltd., 25 kgs., Rs. 66,898.

EPHEDRINE HCL: From China: Ranga Pharmaceuticals Pvt. Ltd., 400 kgs., Rs. 2,40,629.

GLYCERINE BP: From FRG: Khoday Distilleries Ltd., 5,000 kgs., Rs. 1,44,337; Khoday RCA Inds., 10,000 kgs., Rs. 2,88,673.

GRISEOFULVIN: From Hong Kong: Alfred Bere & Co. (India) Pvt. Ltd., 50 kgs., Rs. 36,698.

LACTOSE: From Netherlands: Medopharm, 19,000 kgs., Rs. 2,20,042.

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LACTOSE BP 200: From Netherlands: Eskayef Ltd., 20,000 kgs., Rs. 2,27,399.

LACTOSE USP: From Netherlands: Medopharm, 6,000 kgs., Rs. 69,487.

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TARTARIC ACID: BP: From Spain: Dr. Reddy's Laboratories Ltd., 18 mts., Rs. 7,34,818.

TRIAMTERENE BP: From Spain: Eskayef Ltd., 1,000 kgs., Rs. 4,24,508.

VANILLIN USP: From France: Dr. Reddy's Laboratories Ltd., 9 mts., Rs. 17,36,732.

es 12,500 kgs., Rs. 2,08,502; From Japan: Sumitra Plastics Ltd., 1,50,000 kgs., Rs. 28,55,716.

LDPE GRANULES: From Singapore: Derjay Plastics Pvt. Ltd., 83 mts., Rs. 5,74,558.

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POLYACETAL RESIN: From Taiwan: Zip Inds. Pvt. Ltd., 1,100 kgs., Rs. 35,613.

POLY CARBONATE MOULDING POWDER: From FRG: Electronic Res. Pvt. Ltd., 420 kgs., Rs. 39,362.

Plastics Materials Imported

MADRAS

(From 1.5.88 to 30.5.88)

CAPROLACTAM: From FRG: Shriram Fibres Ltd., 272 mts., Rs. 67,80,628; From Italy: Shriram Fibres Ltd., 3,11,600 kgs., Rs. 77,67,930.

EPOXY RESIN: From FRG: Kothari Electronics Ltd., 14,865 kgs., Rs. 5,68,760; From Japan: Electronics Consortium Pvt. Ltd., 1,920 kgs., Rs. 1,22,168; Electronic Res. Pvt. Ltd., 300 kgs., Rs. 64,137; Suchitra Electronics Pvt. Ltd., 288 kgs., Rs. 21,013; From Korea: Suchitra Electronics Pvt. Ltd., 5,752 kgs., Rs. 3,50,030.

HDPE: From FRG: Vijay Plasweaves Pvt. Ltd., 12,500 kgs., Rs. 2,08,502; From Japan: M. M. Naine & Co., 49,500 kgs., Rs. 9,44,215; From Japan: Pear Sacks Pvt. Ltd., 35 mts., Rs. 7,09,288; HM Plastics Pvt. Ltd., 50 mts., Rs. 8,90,328; From Portugal: Chakra Circular Sacks, 16,500 kgs., Rs. 3,11,007; Quality Filaments, 16,500 kgs., Rs. 3,08,713; R. N. Polysacks Ltd., 16,500 kgs., Rs. 3,08,703; Ram Filaments, 16,500 kgs., Rs. 3,08,713; From Singapore: Asian Bags (P) Ltd., 16.5 mts., Rs. 3,03,716; International Plastics, 16,000 kgs., Rs. 2,71,832; Siva Plastic Industries, 16.5 mts., Rs. 3,03,716; Sun Polysacks Pvt. Ltd., 8.25 mts., Rs. 1,50,757; From Saudi

Arabia: Bhupendra Plastic Inds., 17,150 kgs., Rs. 2,69,189; Earnest Decopack Inds. Ltd., 17,150 kgs., Rs. 2,78,237; Kwaliti Plastic Inds., 17,150 kgs., Rs. 2,51,093; Kwaliti Polymers, 17,150 kgs., Rs. 2,69,189; Mayuri Packs Pvt. Ltd., 17,150 kgs., Rs. 2,78,237; Popular Plastics, 17,150 mts., Rs. 2,78,237.

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94,637; From Italy: Trans Plastics India Ltd., 2,000 kgs., Rs. 36,000 kgs., Rs. 36,014.

POLYETHYLENE GRANULES: From Portugal: Ambigai Polysack, 16,325 kgs., Rs. 3,05,463; Surya Filaments, 33,000 kgs., Rs. 6,17,426.

POLYETHYLENE MOULDING POWDER: From Saudi Arabia: Plastic Industries, 17.15 mts., Rs. 2,60,141.

POLYPHENYLENE OXIDE: From Singapore: Electronic Research Pvt. Ltd., 2,400 kgs., Rs. 1,70,003.

POLYPROPYLENE COPOLYMER: From Italy: Kunal Engg. Co. Ltd., 30 mts., Rs. 5,52,004.

POLYPROPYLENE GLYCOL USP: From Singapore: Universal Polymers, 8,600 kgs., Rs. 1,00,956.

POLYSULFIDE SILANE: From Belgium: MRF Limited, 1,000 kgs., Rs. 1,96,136.

POLYVINYL ALCOHOL: From UK: Chemicals & Plastics Ltd., 1,000 kgs., Rs. 60,457.

POLYPROPYLENE: From FRG: Transplastics (I) Ltd., 10 mts., Rs. 2,35,677; From Italy: Transplastics India Ltd., 12,000 kgs., Rs. 2,24,086; From Japan: Electronic Research Pvt. Ltd., 2,000 kgs., Rs. 1,29,263; From Singapore: Asian Agencies, 24,750 kgs., Rs. 4,62,177; VPS Ayyam Perumal & Sons, Ltd., 32,000 kgs., Rs. 5,90,914.

POLYPROPYLENE RESIN: From USA: MM Rubber Co. Ltd., 30,000 kgs., Rs. 5,14,412.

POLYSTYRENE: From Australia: gorden woodroffe Ltd., 3,200 kgs., Rs. 83,777.

PROPYLENE GLYCOL: From Singapore: Universal Polyma, 25,800 kgs., Rs. 3,02,868; From USA: Colour Leathers (P) Ltd., 16.77 mts., Rs. 1,91,393.

SYNTHETIC RESIN: From Japan: Hyderabad Connectors Ltd., 300 kgs., Rs. 14,245.

MATERIALS EXPORTED MADRAS

(From 1.4.38 to 31.5.88)

ALUMINIUM FLUORIDE: To Melbourne: Tamil Nadu Fluorine & Allied Chemicals Ltd., 2,97,500 kgs., Rs. 27,86,697.

ALUMINIUM HYDROXIDE: To Colombo: Medopharm, 4,911.5 kgs., Rs. 79,878.

CALCIUM CARBONATE: To Minaquaboods: Ennor Muds &

Chemicals, 48,150 kgs., Rs. 42,986.

L-TYROSINE: To Chicago: Srinivasa Cystine Ltd., 1,000 kgs., Rs. 3,01,407.

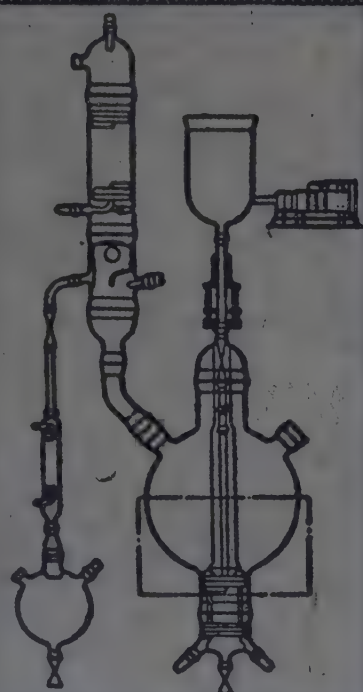
PHTHALIC ANHYDRIDE: To Bangkok: Thirumalai Chemicals Ltd., Rs. 5,04,000 kgs., Rs. 41,28,440.

SODIUM HYDROSULPHITE: To Antwerp: Tamil Nadu Chemical Products Ltd., 49,500 kgs., Rs. 7,56,670; To Barcelona: Tamil Nadu Chemical Products Ltd., 49,500 kgs., Rs. 7,15,254.

STABLE BLEACHING POWDER: To Singapore: Mettur Chemical and Inds. Corpn., 20,000 kgs., Rs. 52,303.

ZINC STEARATE: To Colombo: Ponds (India) Ltd., 700 kgs., Rs. 39,815.

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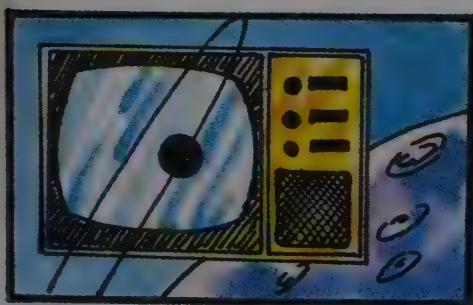
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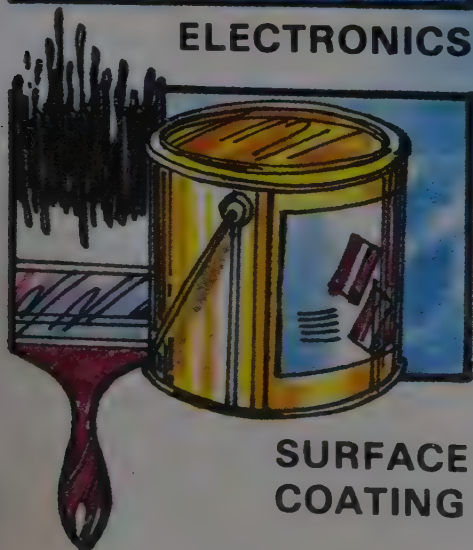
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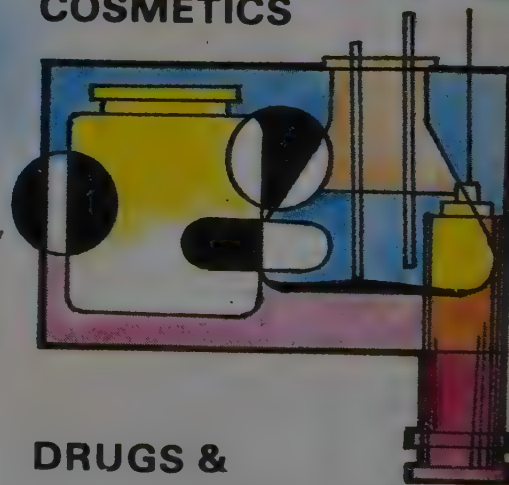
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Chemical Weekly

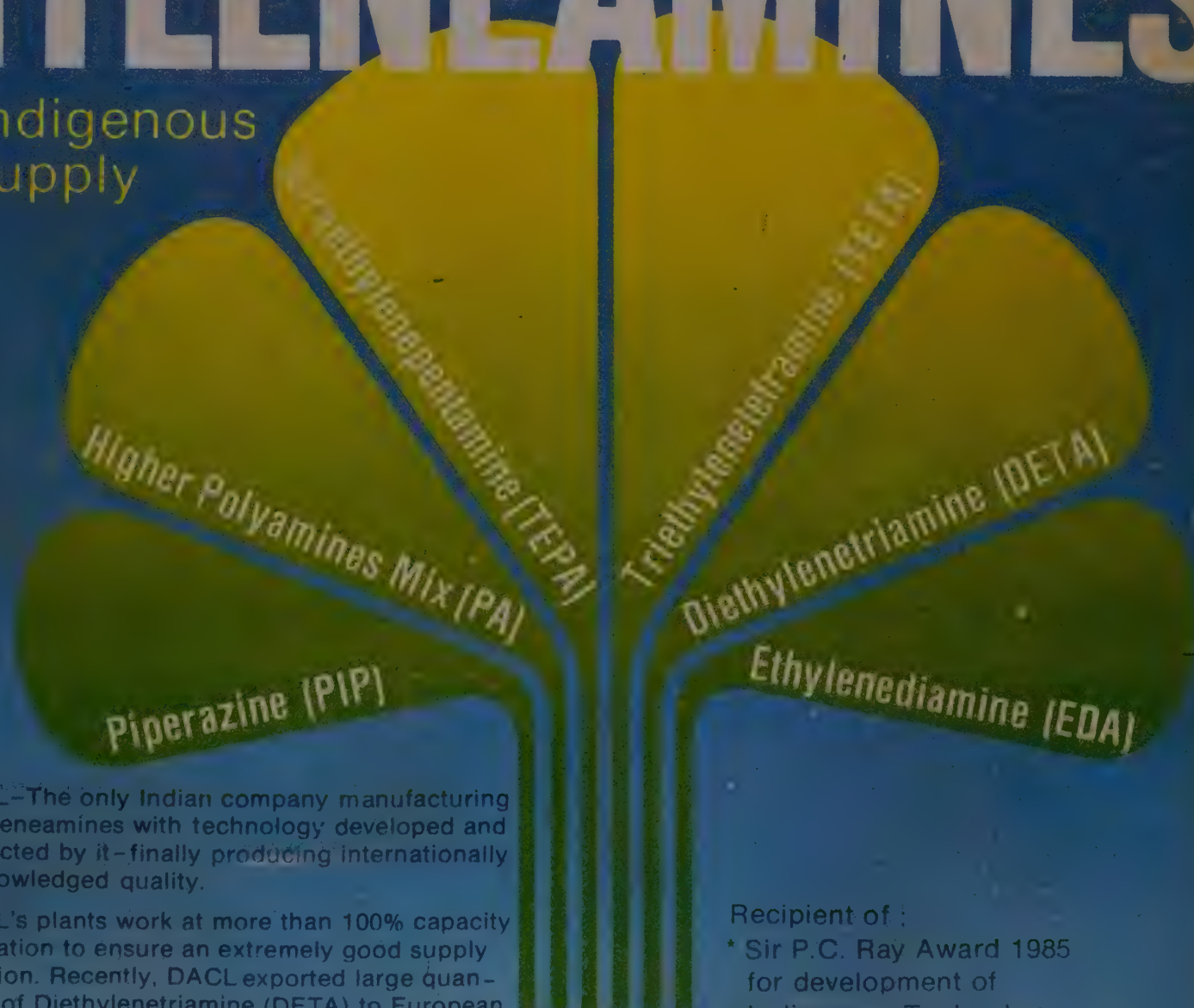
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NO. 5

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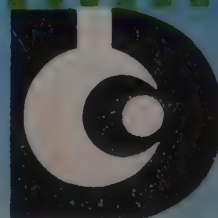
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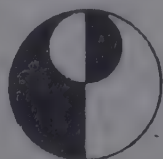
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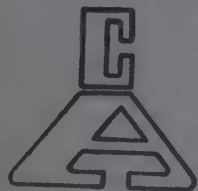
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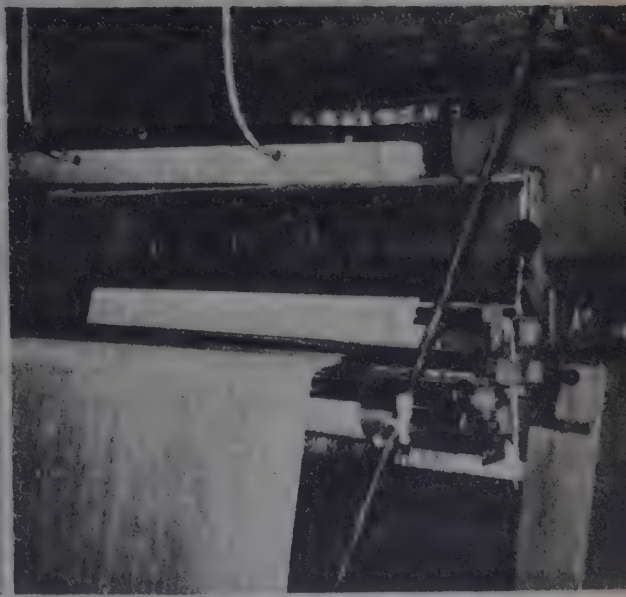
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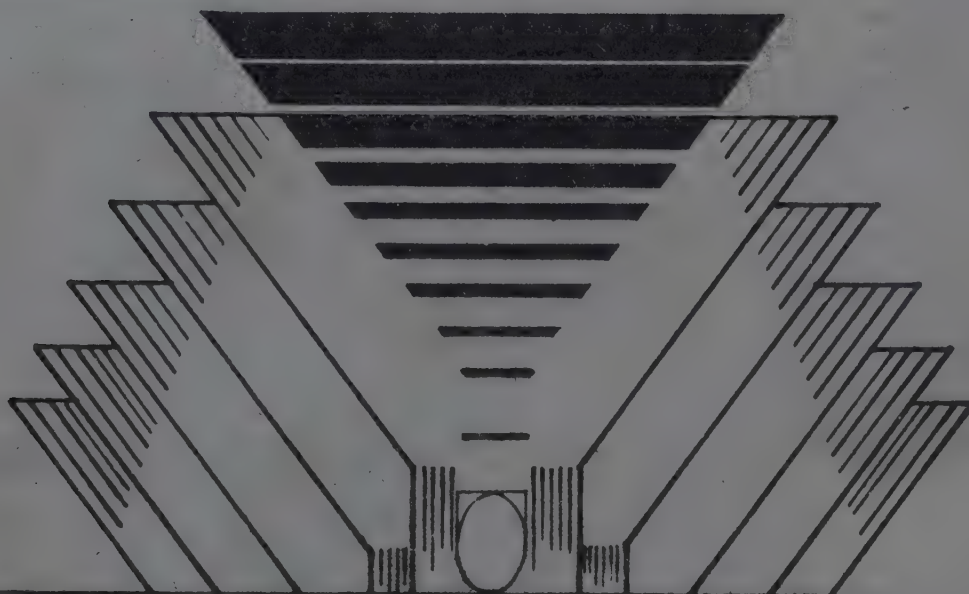
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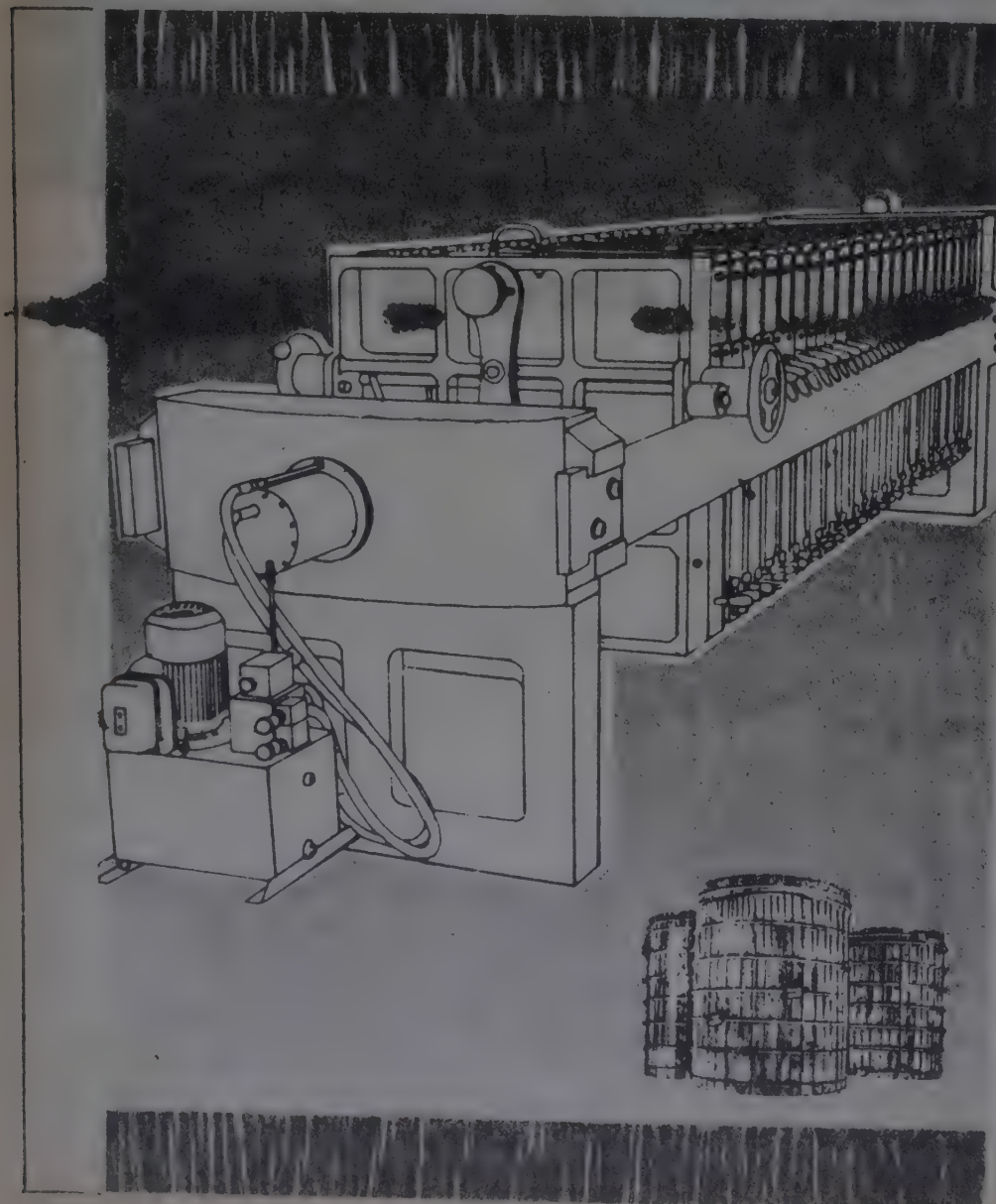
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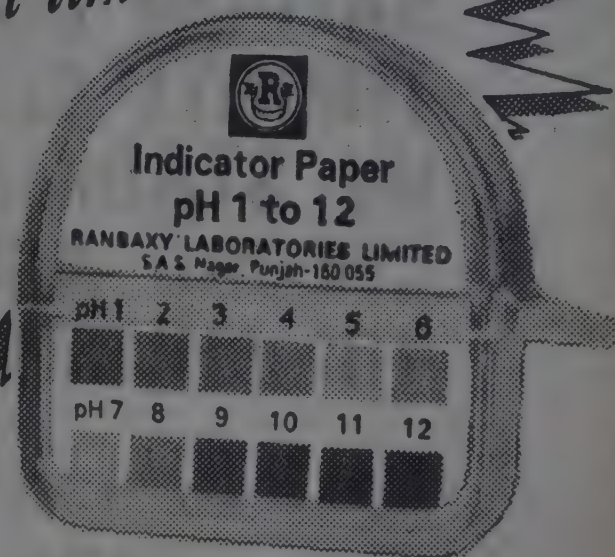
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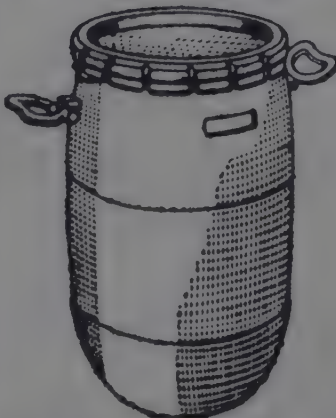
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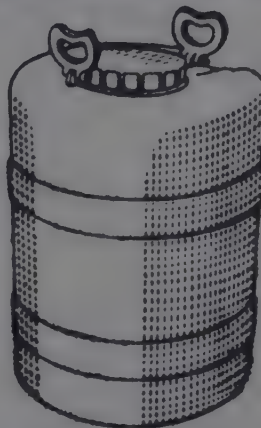
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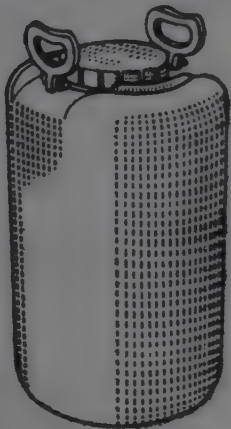
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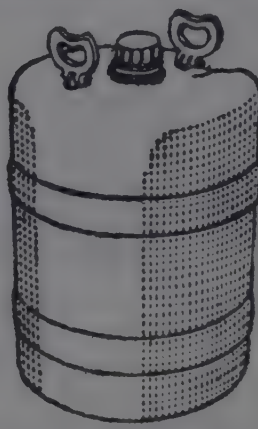
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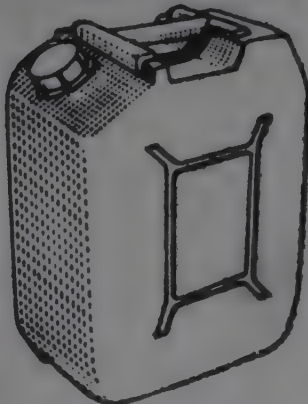
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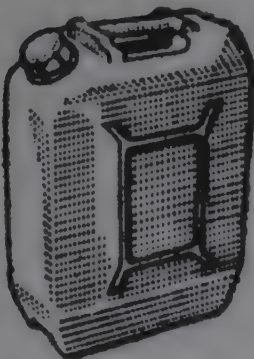
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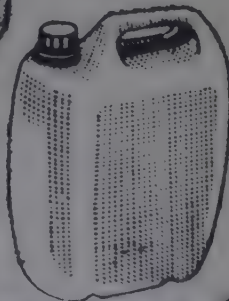
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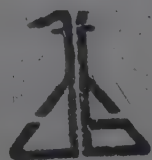
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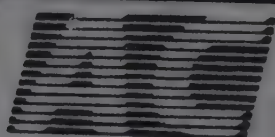
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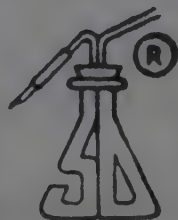
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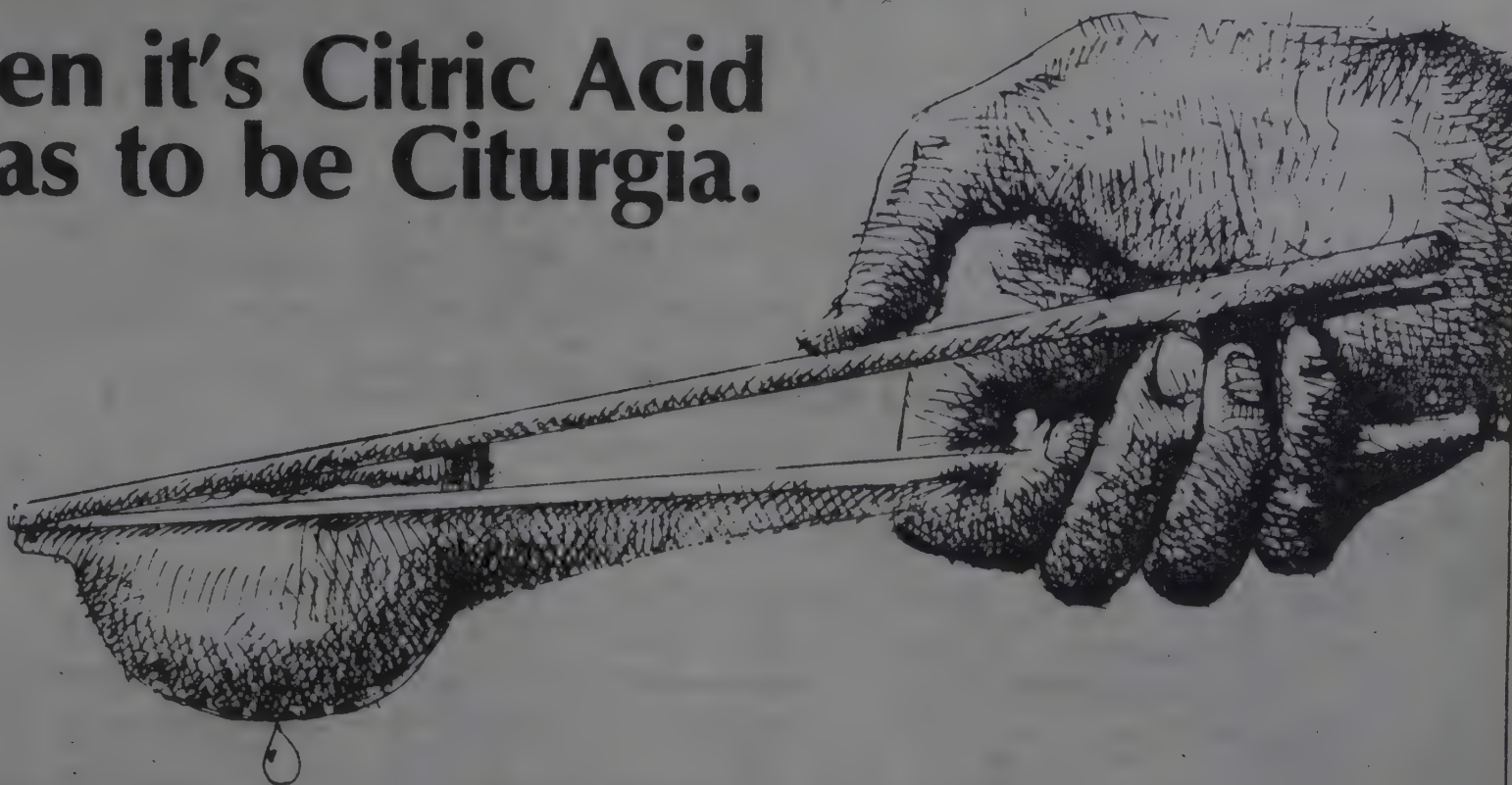
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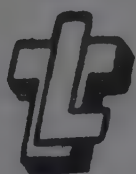
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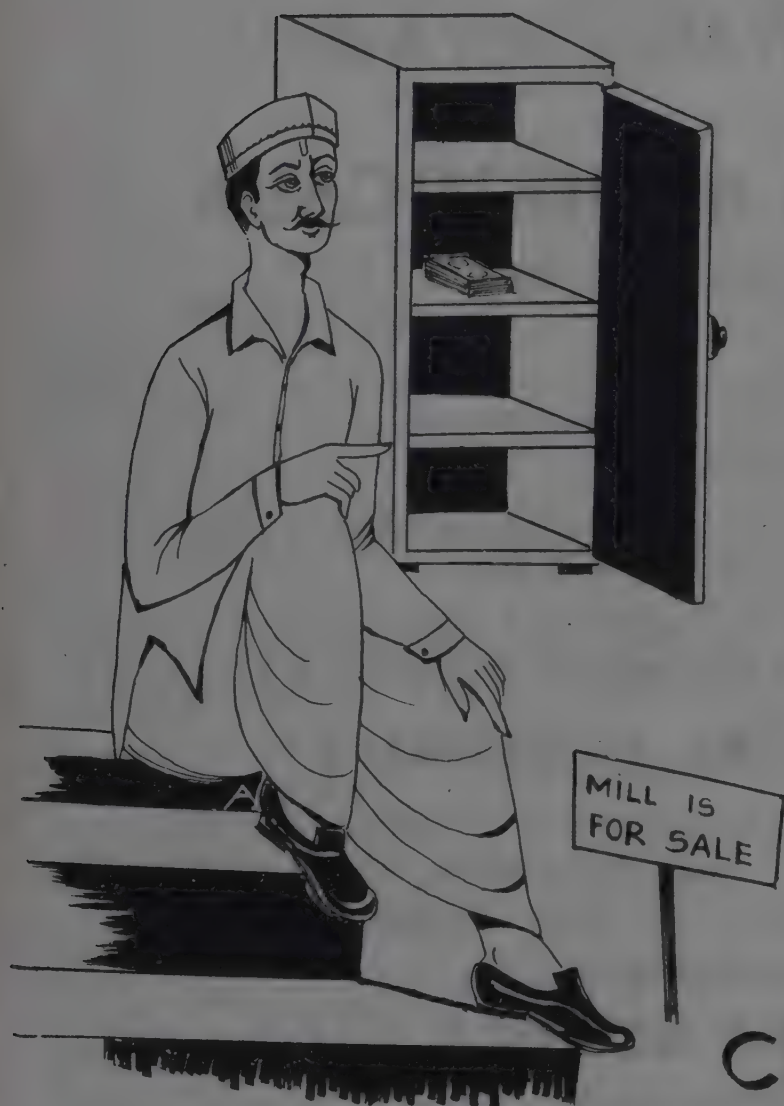
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Human hair and the chemistry behind it

A survey of the literature on this subject reveals that hair is a popular biological specimen that has been frequently analysed for minor and trace elements by numerous investigators in many countries using a variety of analytical techniques.

Hair is not a critical organ but it may in a general way be used as an indicator of the level of exposure to potentially toxic elements or of the level of supply for essential elements. Besides deposition during formation of the matrix or by way of sweat or sebum, external contamination is one of the sources of trace elements in hair. For some elements, the level in hair may reflect the level of intestinal absorption or in specific situations the accumulation in the body (stores or body burden) or in particular organs. In hair, elements such as Ca, Mg, Na and Zn are normally present in the range about 50 $\mu\text{g/g}$. Al and Cu occur at the $\mu\text{g/g}$ level. As and Pb are also found at the $\mu\text{g/g}$ level in unexposed persons. Cd, Cr and Ni are present at less than 1 $\mu\text{g/g}$ in unexposed individuals. Hair is a good indicator specimen for Hg, especially for methyl Hg as well as for elements such as As and possibly also for Pb and Tl. For Cd it appears to be less useful. The body burden of Cd is not reflected. The uptake of internal Cd is relatively low in contrast to external contamination which can be very high. Generally speaking, only a few studies have demonstrated correlations between hair content of several elements and various compartments in the body under particular conditions of investigation. However, with the exception of inorganic Hg, methyl Hg and Cd, the physiological relations, especially in a quantitative sense, between hair and intake, resorption, body burden, concentration in blood or specific tissues remain to be shown.

At moderate levels of exposure, the threat of external contamination for Cd and Pb raises doubts and calls for stricter quality control efforts. Preanalytical washing may also contribute to erroneous data for hair. In contrast to Cd, the elements Hg and Zn have a higher metabolic rate of transfer to hair and even more so in the case of methyl Hg. It has been shown that after cessation of ingestion of organic mercury compounds, the level of Hg in hair decreases parallel to the level in blood. At the moment, therefore, Hg in hair must be considered a meaningful parameter for assessing the intake of methyl Hg.

The biological meaning of levels of essential elements in hair often remains doubtful, since fluctuations of these elements due to homeostatic control mechanisms in the pool which supplies hair may obscure the direct reflection of a nutritional deficiency. Thus,

normal to elevated Zn levels have been found in hair despite acute Zn deficiency. With Se, contamination from hair washing media is a real threat and, therefore, platelets, erythrocytes or even whole blood are preferred as alternate specimens. Similar difficulties are also seen with Cu. An evaluation of the results for these elements from investigations in several countries has shown that despite appreciable differences in living habits, it is difficult to establish unequivocal differences in the composition of hair samples procured from different population groups within the same country, e.g. rich and poor, rural and urban, children and adults, males and females, etc. However, some differences are noticed when distinctly differing populations drawn from different geographical locations are compared. For example, in relation to the values found for Zn in the European samples (200 to 250 $\mu\text{g/g}$), marginal to low (100 to 140 $\mu\text{g/g}$) values of Zn have been found in several Asian and African countries. Likewise, low Cu concentrations in hair have been found in samples from Bangladesh, Nigeria and Pakistan (7 to 11 $\mu\text{g/g}$) compared with the commonly reported 15-25 $\mu\text{g/g}$ in most of the European countries and in the American subjects.

Historically speaking, the high level of arsenic present in the hair of Napoleon Bonaparte soon after his death at St. Helena, was taken as clear proof that the cause of Napoleon's death was arsenic poisoning. A new newspaper scare over the safety of hair dyes has been prompted by the deaths of two Belfast women from kidney failure. A paper in the *British Medical Journal* has tentatively linked the deaths to regular use of commercial hair dyes containing para-phenylene diamine. Para-phenylenediamine or pPD (IUPAC name 1,4-benzenediamine) is widely used in permanent and semi-permanent hair dyes. It acts as a 'primary', a low molecular weight compound that can penetrate into the hair and is then oxidised with hydrogen peroxide to a reactive intermediate. This intermediate then bonds to another low molecular weight dye, the 'coupler', to form a large dye molecule.

Previous health worries have stressed allergic effects or carcinogenicity. Allergic reactions to pPD and related chemicals are well known and its use was banned in some European countries early in the century. Around one person in 25 is sensitive to pPD, and a quarter of those are acutely sensitive. A booklet issued by the Health and Safety Executive last year on the use of hair preparations safely in the salon, warns hair-dressers to wear gloves when using permanent oxidation dyes, and says 'Do not use without first carrying out a sensitivity test'. This patch test on the customer of pPD sensitivity is required under EEC and US regulations.

However, greater fears were caused in the 1970s by a spate of reports that phenylenediamine dyes were showing up as carcinogens in animal tests and its sulphate were withdrawn voluntarily by manufacturers in the US after the Food and Drug Administration slapped a strongly-worded warning label on the packets in 1978. Although not conclusive, this was enough for the Italian Government to ban a slate of nine compounds in 1977. The EEC brought in regulations in 1977 which limited the amounts of pPD and its salts in hair colours to not more than 6% of the product. This limit is now incorporated in UK regulations. The deaths reported by Dr. J.H. Brown and others in the *BMJ* raise a completely new question. The cases involved two women, aged 51 and 62 respectively who died of acute kidney failure in Belfast City Hospital. The younger woman had used a henna hair dye 'for many years'; she had suffered partial kidney failure four years before. The other woman had used a hair dye for two years.

Brown et. al. recalled that cases of acute renal failure had been reported in 1982 from the Sudan, where women stain not only their hair but also their bodies for marriages and other festivals. Henna can take many hours to apply. But mixed with pPD, available in the market, the treatment is reduced to a few minutes. Henna and pPD also give a darker hair colour than henna alone. The large quantities involved however, led to 20 reported cases of renal toxicity in the city of Kartoum alone over a period of two years. The toxicity of the 'black crystal' mixture is sufficiently well-known in the Sudan for it to be used in suicidal and homicidal poisonings.

Dr. Brown and his colleagues point out that pPD-containing hair dyes are widely available over the counter for use in the home, and they warn that the '(kidney) lesions in our patients may have been caused by prolonged use of the substance'. However, Marion Kelly, Director-General of the Cosmetic, Toiletry and Perfumed Associations (CTPA) told *Chemistry in Britain* that a literature survey had found no mention of any previous cases related to commercial hair dyes. 'It is the first case of kidney damage we've ever heard of', she said. 'It would be irresponsible to say that the cases are not related to hair dye, but two known cases in umpteen millions doesn't seem to be a case for great concern'. The CTPA has no figures on the worldwide usage of pPD-containing dyes, but it runs into tens of millions of people in the western world. The association has written to the Belfast doctors to ask for further information including ('as discreetly as possible') the ethnic origins of the women and the products used, if known. In the absence of other information, Kelly said, 'we must continue to rely on the published toxicological data', pPD and other dye compounds have been extensively tested in animals and the regulations were reviewed recently -- in 1983 in the EEC, 1984 in the US. 'It would be a little strange', Kelly said about these tests 'to look at a range of organs for tumours and yet miss a shrunken or malformed kidney'.

Baldness might rank alongside mothers-in-law in the repertoire of stand-up comics, but it is nonetheless shocking to hear doctors report cases of men reduced to tears and roaming the UK in search of a solution of their loss. For a small minority, normal male baldness can lead to gross psychiatric problems regarding their appearance. So the recent announcement of a 'cure' for baldness might not only allow sufferers to regain strength like Samson, but cause

the stock price of Upjohn, the drug company responsible, to rise accordingly. To be fair to Upjohn, the company does not claim to have found a hairproducing miracle, but a preparation that stops hair loss worsening and sometimes causes hair regrowth on a suitable patient. According to Dr. Norman Macleod, medical director of Upjohn. 'Regaine is the first scientifically studied prescription product for male pattern baldness to be cleared by the UK licensing authority'. The list of qualifications for suitable candidates for treatment is lengthy; they should be young (in their 20s) must only have been balding for around 10 years and have a small amount of baldness on the top of the head, less than 10 cm in diameter.

In 1985, encouraged by anecdotal reports from the US of hair regrowth in male patients on the drug minoxidil for high blood pressure, the Glasgow Royal Infirmary established a two year clinical trial. This involved applying the drug to the scalp. Two hundred and fifty volunteers aged between 18 and 49 were recruited, 66 of whom were suitable. Upjohn discovered a 'significant benefit' of Regaine compared to the placebo after four months of treatment. Within a year some patients saw benefits, although some experienced no change. However, the improvement only occurred if the solution was applied twice a day and the hair washed daily. If the patient discontinued using Regaine, the regrown hair fell out within three to four months and the balding process continued.

The process of male balding is a normal phenomenon controlled by hereditary factors and mediated by normal hormones. It has been known since the Ancient Egyptians that eunuchs do not go bald whatever their genetic predisposition -- they lack the male hormones (androgens) such as testosterone. However the absolute amount of male hormones does not govern the degree of baldness, only the way the hair roots respond to normal androgens controls the degree of hair loss. In the growth phase of the hair cycle, or anagen phase, hair grows at an average rate of 0.0148 inches (0.370mm) per day. At any given time 90% of scalp follicles are in the anagen phase, lasting from three to five years. The hair then moves on to a catagen phase, a transitional stage lasting only one or two weeks. Then the hair follicle shrinks and hair growth ceases. Finally the hair enters the telogen phase where it remains for three months before falling out and being replaced by new hair. Even with the knowledge, scientists are as yet unclear about the role of androgens in the cycle or the effects of minoxidil on the hair.

Throughout history treatments have been varied -- usually mirroring the most appropriate placebo of the era. Since androgens became known as the mediators of this condition in the 1940s, vast research efforts have been undertaken to find anti-androgenic chemicals without important side effects. One particular benefit of Regaine is that since it is applied topically there are no internal physical side effects. Even allowing for the success of Regaine in controlling loss of hair, the cost will limit its use. At approximately £30 for a 60 ml bottle lasting a month, and with the condition this must be applied twice daily, a man's vanity would have to be strong for him to pay up. Alternatively, cynics add that "Upjohn will drive men to crime in their attempts to find money for the cure".

-- T.P.S. RAJAN

(Source: *Food Laboratory News Letter* -- September, 86; *Chemistry in Britain* -- June, 88).

CHEMARENA

S.L. VENKITESWARAN

Acetic acid or n-Butanol?

The questions relating to the appropriate use of ethyl alcohol for chemicals continue to confuse Government's policy makers. One hand nearly 100,000 tonnes of capacity based on methanol has been approved since over a year with no progress while capacity for small units based on ethyl alcohol have been turned down on one reason or other. As against this approval of capacity for n-butanol based on ethyl alcohol has been granted to the extent of double the requirements at the end of the Eighth Plan. It is a pity that there is apparently inadequate appreciation of economic realities and appropriate usage of the emerging large surplus of alcohol in the coming years. The cases of acetic acid and n-butanol needs to be reviewed urgently if cogent and viable programmes based on ethyl alcohol are to emerge on time.

Regarding acetic acid the relevance of the technology for making it from methanol in India under the present circumstances was examined in these columns. The points brought out were:

1. The much higher investment per tonne of capacity even at the minimum level of 50,000 TPA.
2. The large component of foreign exchange outgo for technology and equipment imports -- to an estimated Rs. 30 crores or so for a 50,000 TPA plant.
3. The extensive haulage of the product to ensure its off-take.
4. Uncertain economics of the production with possibly Rs. 2 per kg. of acetic acid when produced from methanol as against production from ethyl alcohol in integrated projects with only a nominal levy by the State Excise Authorities.
5. Acetic acid even if competitively produced will provide addition to the offtake of methanol by only 10 to 15% of its production and hence is not a logical outlet for methanol capacity for which licence has been approved far in excess.
6. Action of Government in denying more capacity for acetic acid from ethyl alcohol will only lead to serious

repercussions on the proper utilisation and disposal of by-product molasses at sugar factories.

Apparently the urgency of providing free rein for acetic acid production from ethyl alcohol has not been realised. This short-sighted policy results in higher prices for acetic acid in situations of shortage such as at present -- escalation in price which has nothing to do with the technology and raw material. It is also necessary that approval of fresh capacity for acetic acid is based preferably linked to the production of alcohol for captive use or from the immediate neighbourhood.

The above policy on acetic acid is in sharp contrast with that on butanol for which approvals of capacities far in excess of requirements have been granted. One recent estimate is that as against a demand of 22,000 to 24,000 tonnes in 1994-95 the total of installed plus approved capacities is over 45,000 tonnes with 25,000 tonnes of this in U.P. There is some uncertainty of the demand of 22,000 to 24,000 tonnes due to the fact that one use of n-butane to make n-butene for use as co-monomer in polyolefins is set to be discontinued when the production of n-butene from ethylene in the M.G.C.C. complex gets going. There is also some non-appreciation of realities when capacity for n-butanol is approved merely on the basis of surplus acetaldehyde without relevance to the process by which acetaldehyde is made from ethyl alcohol.

The logic of converting ethyl alcohol into n-butanol rests on the use of dehydrogenation process for acetaldehyde whereby the byproduct hydrogen is integrated with the subsequent stages of conversion of acetaldehyde to n-butanol without seeking an external source of hydrogen. The large excess of n-butanol capacity could have been far more valuable if 2-ethyl hexanol were an alternative product to n-butanol from crotonaldehyde onwards. Assuming that all the licensed additional capacity for n-butanol is established the result will be low level of capacity utilisation, higher costs and no significant addition to the usage of the surplus ethyl alcohol. It is high time that Government takes a second look at the Report of the earlier committee under Dr. Bhattacharya.

Shortlived sensation

We had referred to a paper published in the prestigious journal *"Nature"* (See **CHEMICAL WEEKLY** August 30, 1988) on some unbelievable research results on what was termed "imprint of memory of past solutes" in water leading to biological activity of the imprinted skeletons even when the molecules could not be present. This unbelievable result has now been found not reproducible and in the nature of a delusion by the editor John Maddox who spent five days observing researchers perform the reported experiments under carefully controlled conditions. The investigating team is sharply critical of the results reported earlier. But one fails to understand why *Nature* published the paper after waiting for nearly two years after receipt only to publish the rebuttal soon after. Is it a game of sensation and counter sensation.

The original author Benveniste has also been given opportunity to answer and terms the investigation a "mockery of scientific enquiry and filled with inaccura-

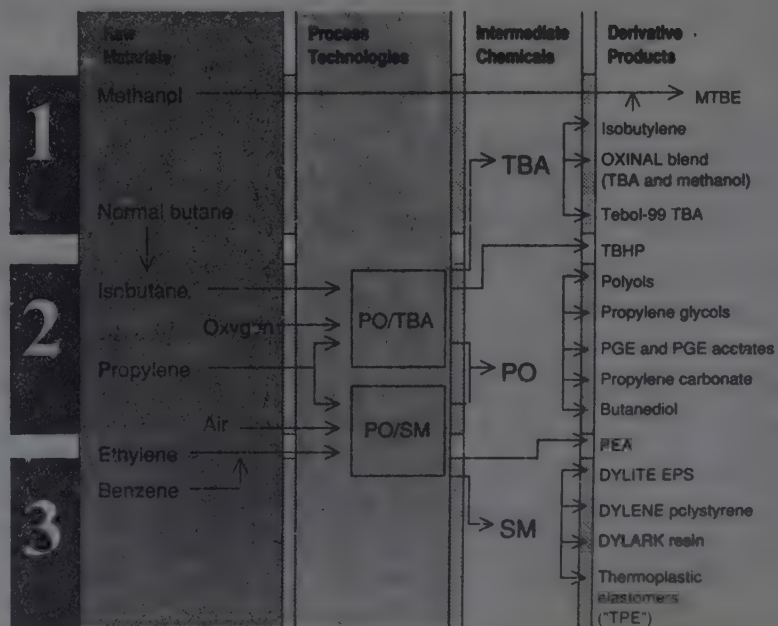
cies and distortions". He had claimed that his original results had been confirmed in other laboratories in Italy, Canada and Israel. The claim was that an aqueous solution of an antibody retained its abilities to evoke biological response even when diluted to a point where no antibody molecules could be expected to remain. The new results initiated by *Nature* show that there is no substantial basis for the claim and that the experiments lacked good statistical control to justify conclusion of the activity of nonexistent molecules. It is claimed that the samples were contaminated with proteins but this does not answer the claims originally made. It is true that the very idea and claim of Benveniste and colleagues run counter to well established scientific theory and should not have found acceptance belief but Mr. Maddox wanted to put it before the scientific community due to a "mixture of curiosity and exasperation". Whatever be the controversy, this episode on nonexistent molecules or maya now gets a scientific burial and perhaps many have a resurrection later.

Arco Chemical's triumphant trio

Arco chemical reigns supreme and profitably with three commodity chemicals and little of specialties. This is the result of one of the most successful process of oxidation of propylene to the oxide through organic hydroperoxides, taking a leap out of the cumene route to phenol. The peroxide for the oxidation is derived from one of two basic materials -- isobutane or ethyl benzene -- which end up as high volume derivatives which are already well established viz. isobutylene and styrene. The success of this original Halex technology has led Arco to two billion dollar sales and high 20% profits on sales in the short span of a decade. The picture of the basic raw materials and primary products with the potential for successful downstream derivatives is given in the chart (from *Chem. Business*, August, 1988).

Out of the 3 million tonnes of propylene oxide (PO) capacity worldwide Arco has 55% and spread worldwide. Only Dow Chemicals makes PO in competition still using conventional chlorhydrin technology but capatively using 75% of its PO production. To build up for the future Arco is also diversifying into downstream products -- polyols, MTBE, TBA, polystyrenes -- while these are known conventional products. Arco is breaking new ground with a superabsorbent fibre based on TBA and

plans for methyl methacrylate from isobutylene and for butanediol from PO via allyl alcohol tetrahydrofuran and N-methyl pyrrolidone. A non calorie substitute for fats and oils is also in the line up based on original R&D efforts. Arco does not hesitate to spread worldwide and the latest venture is to be in South Korea with other Far East Countries. Arco has the highest and record sales to person ratio of \$ 807,000.



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IOC, BPCL to supply intermediates at international prices

A scheme has now been finalised by the Union government for the supply of naphtha and benzene by the Indian Oil Corporation (IOC) and the Bharat Petroleum Corporation Ltd. (BPCL) to the Indian Petrochemicals Corporation Ltd. (IPCL), the Hindustan Organic Chemicals Ltd. (HOC) and the National Organic Chemicals Industries Ltd. (NOCIL) at international prices to exporters of drugs, dyes and agrochemicals.

The scheme envisages that the IOC and the BPCL would supply benzene at international prices to HOC and naphtha to the IPCL and NOCIL, who in turn, would supply downstream intermediates to the exporting units by passing on the cost benefit to them against surrender of advance licences.

To work out the price reduction in the supply of downstream products, based on benzene and naphtha, the commerce ministry has finalised the related input-output norms for the products for benzene-based nitrobenzene,

aniline acetanilide, nitrochloro benzene (ortho and para) and phenol from cumene route in the case of the naphtha-based, ethylene oxide and mono ethylene glycol.

Under the intermediate advance licence scheme, HOC would be entitled to get benzene at international prices and the IPCL and NOCIL would be entitled to get naphtha at international prices from IOC/BPCL or through imports. Norms for other naphtha-based downstream products would be finalised soon.

This scheme will meet the long-awaited demand of the industry to supply critical raw materials at international prices so that they may become competitive in exports. More particularly, this scheme will benefit a large number of small and medium-scale exporters in the areas of drugs, dyes, and agrochemicals which have been identified as thrust products for exports in the seventh five-year plan.

The laminating units, which had been producing much below their rated capacities because of low demand have now been geared up to meet the increased demand as a result of the mandatory jute packaging order.

With most of the problems between the fertiliser and jute industry hammered out and the IJMA committing itself to ensure steady supplies, those fertiliser units that have not placed orders or have been opting for HDPE bags are expected to put in their orders for jute bags soon, Mr. Kanoria said.

According to a background paper prepared for the meeting, the anticipated urea production, all of which had to be packed in jute bags as per the order, for the year 1988-89 is 115 lakh tonnes. The industry would, therefore, require about 23-crore bags per annum, consuming 1,000 tonnes of D. W. Tarpaulin a month, which the mills are fully geared to meet.

IJMA suggested that since the production of urea is planned, FAI should give a demand forecast every quarter, for the benefit of the mills.

Since it normally takes 30 days to manufacture and supply laminated jute bags, the paper suggested that a lead time of at least 60 days be given till sufficient inventories are built up in the fertiliser factories.

Besides, it would be desirable to make a uniform purchase contract drawn up by FAI and in consultation with IJMA. With D. W. Tarpaulin constituting 75 per cent of the costs, it would be possible to eliminate fluctuations in prices, if the fertiliser companies lifted their requirement of the cloth directly from the mills, at prices fixed from time to time or on contracts on average monthly prices, the paper said.

MP HOUSE PANEL ON HAZARDOUS CHEMICALS

The Madhya Pradesh Vidhan Sabha Speaker, Mr. Rajendra Prasad Shukla, announced an eight-member committee of the House for an on-the-spot assessment of hazardous chemicals in the Union Carbide pesticide factory in Bhopal.

The committee under the Deputy Speaker, Mr. K. L. Yadav, was announced in the Vidhan Sabha in response to the Opposition demand while discussing an adjournment motion on the issue.

Forum on fertilizers units' jute packaging needs

A joint forum of the fertiliser and jute industry along with jute laminating units was set up recently to look into the fertiliser units' requirement for jute based packaging material.

Briefing newsmen after a day-long consumer-manufacturer meeting between the Indian Jute Mills Association (IJMA) and the fertiliser industry, represented by the Fertiliser Association of India (FAI), held in Calcutta recently, Mr. H. V. Kanoria, Chairman, IJMA, said the forum would comprise one representative each from the Gujarat Narmada Fertiliser Corporation (GNFC), Rashtriya Chemicals and Fertilisers (RCF), KRIBHCO and National Fertiliser (NFL).

IJMA and the jute laminators would be having three members each in the forum. The latter would be headed by the Chairman of IJMA.

The meeting among other things, discussed the price, quality and availability of jute packaging material for the fertiliser industry. IJMA would henceforth circulate a reasonable price of D.W. Tarpaulin, on the basis of which

the fertiliser industry could base their negotiations.

The mills would also provide a break-up of the costs to support that the price quoted is a reasonable one. In case an abnormal price is charged, IJMA would intervene and ensure supplies at the right price, Mr. Kanoria said.

Special suggestions from the fertiliser industry including improvement of quality, compulsory ISI branding and prior inspection would be also considered for taking necessary action by IJMA, Mr. Kanoria added.

Conceding that the industry had faced considerable problems in getting supplies of jute bags in the past, he said, that bottlenecks had been sorted out as reflected by the deliveries over the past two months.

During August, the entire requirement of two crore bags a month had been met and though figures for September are not available according to rough estimates, the figure would be substantially higher.



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Dr. O. P. KHARBANDA

Frankly Speaking

O. P. KHARBANDA, Cost & Management Consultant,
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Executive Workstations

The executive workstations have yet to 'arrive' in India, and yet elsewhere we see an article headed, 'Executive Workstations Revive' (Daniel Cross & Bruce Page, Administrative Management, December 1987, page 18-21).

What exactly is a 'workstation'? It is simply a workstation with telephone attached to the side, with options to include voice, data and video communications. At one time, touted as the solution to all the problems at a workplace, the workstation has not come upto its expectation, hence the word 'revive' in the title of the article noted above. Information is the most valuable 'commodity' in business and the workstation was designed to serve as the information centre. Some of its basic requirements are:

- * It displays or delivers information, NOT to input it.
- * It must perform several functions, e.g., telephone, calculator & a terminal.
- * It must be as simple and easy to operate as a telephone.
- * It must be able to talk to and through other communication channels and devices.

Some of the other functions of the workstation include: voice recognition, image-to-text conversion and photoresolution colour graphics. Systems are already available and in use for face-to-face long distance meetings in which voice, video and data can be exchanged. This means a considerable saving of time and cost which has otherwise to be expended on travel. But with a host variety of hardware what is required is a unified structure, so that

the workstation can connect to and 'talk' with computers from IBM, Digital, Prime and others — without the executive having to learn and use several different navigational sequences and command structures. A single unified structure is really what is required of an ideal workstation with touch-screen instead of the keyboard and other alternatives. At present very few of the executive workstations have touch screens, but even these are heavily dependent on proprietary software and not easy to integrate in an office environment. In addition, they are prohibitively expensive too. What is required is a Volkswagen Beetle being driven on a well-paved highway instead of a Ferrari on a bumpy dirt road. Manager needs to have the information, whatever and whenever, as quickly as possible and at low cost too. This is yet to be achieved. Meanwhile, the choices available are proliferating fast enough to confuse the executive and even to embarrass him, even though the 'heart' of the workstation resides in the standard microcomputer. With standard interfaces, these micros can do almost anything with voice, data, text or graphics. Add-in cards with facsimile send-and-receive capabilities also exist. The micro-based workstation is already being used to serve the role of an answering machine and even as a multiuser voice mail system. Special cards for connecting the micro to the mainframes have also been developed. Such extendability and flexibility can help make the micro a real workhorse in the modern office. But one of the serious problems is that hardware acquired in an office from time to time from different vendors is not mutually compatible. How to make optimum use of such equipment? But an executive workstation being designed from scratch could prove a great boon to the busy executive.

Industry Minister Inaugurates HOC Seminar

In commemoration of 40 years of India's Independence and Jawaharlal Nehru Centenary a seminar on "Forty Years of Chemical Industry: Achievements and Future Challenges" was organised by Hindustan Organic Chemicals Ltd. at Rasayani which was inaugurated by Shri Ramrao Adik, Minister of Industry, Labour, Law & Judiciary, Government of Maharashtra on 27th Sept. In his inaugural speech Shri Ramrao Adik highlighted the contribution made by the chemical industry particularly in the public sector units for the national economy by serving a variety of needs of the common man and for the development of the backward areas in the different regions of Maharashtra state. He also appreciated the enormous efforts put in by the public sector, educational and research institutions towards development and growth of the user industries and promotion of indigenous technologies for the benefit of masses.

In his welcome address Shri H. Krishnamurthy, Chairman and Managing Director of the company recalled the glorious contribution of Jawaharlal Nehru both as a freedom fighter and an architect of modern India and explained the background of holding this seminar. He traced the historical development of the chemical industry and how its growth had contributed enormously towards self sufficiency in a number of other industries such as dyestuffs, drugs & pharmaceuticals, pesticides and also in strategic areas like space research and atomic energy. During the pre-independence days the chemical industry was based on Benzene and Toluene derived from coal tar and Acetylene from Calcium Carbide. After Independence the chemical industry has made rapid strides and is today based mainly on petrochemical feedstock. Today the chemical industry occupies fourth position among all industries. He further mentioned that with the increasing availability of crude and natural gas, the next two plan periods would be a golden era for the chemicals and petrochemicals industry which has been recognised by the Go-

vernment of India as a national thrust area.

The key note address of Dr. B.D. Tilak, Director, Centro for Application of Science & Technology for Rural Development (CASTFORD) in dealing with the development of chemical industry and the rapid growth made by it since independence, stated that the present growth of the various consumer industries would not have been realised without the support of the basic inputs contributed by public sector units like Hindustan Organic Chemicals Ltd., Hindustan Antibiotics Ltd., and Hindustan Insecticides Ltd. He projected the country's requirement by year 2001 specially in agricultural production, food grain production and stressed the need for expansion from the present level of 150 million tonnes annually to 300 million tonnes to feed the teeming Indian population by

the turn of the century. In this context he mentioned that HOC and HIL will have to play a major role in the production of modern pesticides and intermediates. Similarly in the field of drugs public sectors like HAL, IDPL and HOC should expand the range of products since they are of great importance to India's concern for family planning and "Health for all" by 2001 programme.

Experts from public sector enterprises like HAL, HIL and from educational and research institutions like IIT, Bombay and National Chemical Laboratory, Pune and other leading private sector companies presented papers on the achievements of the chemical industry during the past 40 years, its present status and the challenges it has to face in the future.

The seminar ended with a concluding session which summed up one day's proceedings and made specific recommendations for the healthy growth of the country.

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Foreign companies seek NRDC knowhow

Foreign companies have approached the National Research Development Corporation (NRDC) for a variety of indigenous technologies involving about \$10 million, the NRDC managing director, Mr. N. K. Sharma, has said.

He told newsmen in Bangalore recently that the companies which had approached are in Abu Dhabi, Argentina, Australia, Brazil, Nigeria and Peru. The NRDC had exported technology to Indonesia for producing triacontanol, a growth promoter, and dehydrated green pepper valued at about Rs. 26 lakhs.

He said NRDC had concluded licensing arrangements with two Indian companies for production of television phosphor used for coating black and white picture tubes. The two plants would commence production by next year-end.

Mr. Sharma said NRDC, under its joint technology development programme with industries achieved a major breakthrough by setting up and successfully operating a pilot plant for extraction gallium of high purity a key electronic material.

He said NRDC had 36 new technologies developed by research and development institution for commercialisation. Besides providing financial support to further improve inventions, NRDC also arranges for patenting new products free of charge for inventors.

Mr. Sharma said NRDC has signed a memorandum of understanding with a private company for licensing of the knowhow for manufacture of electrolytic manganese dioxide (EMD) used in dry cells. Indigenous production of EMD would save a lot of foreign exchange, he added.

He said NRDC has earned a record profit of about Rs. 18 lakhs during 1987-88 as against Rs. 6.5 lakhs last year.

LARGE CHEMICAL STOCKS STILL IN CARBIDE PLANT

A total of 298.16 tonnes of chemicals are still stored in the Bhopal plant of Union Carbide, from where lethal methyl-isocyanate (MIC) leaked in December 1984, killing more than 3,000 people.

The Minister of State for gas tragedy relief, Mr. Hasant Siddique, told the Madhya Pradesh Vidhan Sabha recently that on June 20, 1.5 tonnes of chlorosulphonic acid leaked from the plant but did not cause any damage.

The Minister said chemicals stored at present in the plant include: Caustic solution (15 tonnes), sevidol premix (50 tonnes), gypsum premix (64 tonnes) sevin (26 tonnes), naphthal tar (three tonnes), sevin tar (49 tonnes), and mixed chemicals (85 tonnes).

Mr. Siddique said the Government had appointed a high-level committee, under the chairmanship of former CSIR Director-general, Dr. S. Vardarajan, to examine the chemicals and suggest measures for their disposal.

The suggestions of the committee are: Shifting of those chemicals which are not required to other plants or selling them to other factories, free supply of those chemicals under processing to the Agriculture Department for use in farms free of cost, and neutralisation of material which is not required.

The Minister said most of the chemicals stored in the plant are being disposed off as the committee suggested.

KIOCL EXPORTS UP 42 PC.

The country's largest 100 per cent export-oriented unit (EOU), the public sector Kudremukh Iron Ore Company Limited (KIOCL), achieved a record 42 per cent increase in exports during for the first half of the current financial year (April 1, 1988 to September 30); by exporting Rs. 50 crores worth of iron-oxide pellets and concentrate, as compared to Rs. 35.41 crores in the corresponding period of last year.

According to the company's press release issued in Bangalore on Oct. 3rd a record number of 62 ships sailed from New Mangalore Port with Kudremukh cargo (as against 49 in the first half of last year), with exports going to nine countries, including new markets like the United States of America (USA), North Korea, Qatar, and West Germany.

KIOCL's total production of iron-ore concentrate and pellets increased by 31 per cent during the first half of the current financial year.

S. ARABIA TO BUY 1 M.T KIOCL PELLETS

Saudi Arabia will take about a million tonnes of iron ore pellets from Kudremukh Iron Ore Company under an agreement signed recently.

The value of the contract is \$28 million. The initial consignment will be 30,000 tonnes.

A three member delegation from Kudremukh led by its Chairman and Managing Director, Mr. K. K. Rao, has also signed a contract to supply one million tonnes of iron ore concentrate per year to Bahrain. The company hopes to sell pellets to Qatar and Egypt on a long-term basis.

Kudremukh is a new entrant in this field of direct reduction grade pellets. Others includes Sweden and Brazil. Kudremukh exports its products to 15 countries viz Japan, Australia, China, Malaysia, Qatar, West Germany, Yugoslavia, Hungary, Czechoslovakia, Turkey and the US.

AIPMA PLEA TO CUT DUTY ON RAW MATERIALS

The All India Plastics Manufacturers' Association (AIPMA) on Oct. 3, expressed concern over the Government's inordinate delay in considering reduction of import duty on various plastics raw materials like LDPE, LLDPE, PP, HDPE, PS and PVC resin.

In a press statement issued in Bombay the AIPMA President, Mr. Anil B. Goradia, said that despite repeated representations made to the Government to consider the present acute shortage and high prices of raw materials both in domestic and international markets, no action has been taken so far by way of reducing the Customs duty.

Taking advantage of the shortage of commodity plastics, he said, indigenous manufacturers have from time-to-time increased the prices of plastic raw materials thereby creating hardship for the numerous processing units.

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Role of biotechnology highlighted

A National technology mission on wasteland development, will soon be launched, Mr. S. G. Pitroda, Adviser to the Prime Minister on Technology Missions, announced in New Delhi on Oct. 4.

Inaugurating a four-day international biotechnology is going to play an important role — BIO'88-India '88 — he said will be even bigger than the six other missions taken up.

"In efforts to restructure our system, biotechnology is going to play an important role. Four of the six missions are going to require biotechnology inputs", he said. He asked scientists, industrialists and technocrats to sensitise themselves to the needs of the country and warned them that in biotechnology too, like in other activities, needs perceived were likely to be different from the needs articulated.

Pointing to the dichotomy in the Indian scientific endeavour; of 'brahmin science', (confined to the laboratories) and 'shudra science', (that creates technology) he said the later had been grossly neglected. He called for taking the developments in laboratories to the fields. "We have to look into the various contradictions of our society and see where biotechnology fits in."

Mr. Pitroda said that biotechnology had been recognised as a industry which held out hopes in the field of agriculture, fisheries, process industry, environment and health. "But our time is running out and we have to learn the best available in this new field. For this international linkages are necessary". He wanted the small tribe of venture capitalists to think of their activity as "vulture capital activity" and seize the opportunities that biotechnology offered.

Prof. Pushpa M. Bhargava, Director, Centre for Cellular and Molecular Biology (CCMB), Hyderabad, presented an overview of the developments and the future scenario in biotechnology. He said the basis for excitement in this new area was because of the increased understanding of molecular biology, the decompartmentalisation of knowledge and advancement in instrumentation.

Cloning of humans was likely to become a distinct possibility in the next 10 years. However, he cautioned of its dangers and said the question of ethics and aesthetics might become important in biotechnology. The future weapons, with the possibility of fabricating toxins in the backyard and easy deliverability, would be biology and nuclear-based.

Talking briefly about some of the findings at the CCMB, he said the molecular basis of the action of chloroquin and the resistance of the malarial parasite to it had been recently understood. The other interesting work was the newfound blood cell structures and the discovery that two sub-structures in them were joined together by a kind of cellular bridge. The CCMB has also developed DNA fingerprinting technique which it expects to be commercialised in about six months time.

Dr. K. K. G. Menon, Principal Scientific Adviser, National Dairy Development Board, brought the proceedings to the present day realities and the ground-level scenario in India. Demolishing the overoptimistic picture of others, he said that though biotechnology offered an equal opportunity technology for countries like India, not much had happened by way of development or investment. "We have not done what we could have." Most programmes in biotechnology had been for procurement of equipment from abroad towards which 80 per cent of money was being spent.

He spelt out a series of lacunae that afflicted technological development and its transfer to industry in an area of biotechnology and offered some solutions. The foremost, he said, was the lack of concerted effort and insufficient mission orientation. Clarifying, he said, no work of sufficient depth or dimension towards completing one single goal had been carried out till date.

Mr. S. C. Jain, Joint Secretary, Department of Biotechnology, said that the Department had laid stress on applied biotechnology and was in the process of establishing product lines for some biotechnology products related to the country's needs. "We are encouraging industry and private sector to

take lead in this field. We are not trying to governmentalise each and every activity in biotechnology.

ONGC PRODUCTION TO EXCEED TARGET

The Oil and Natural Gas Commission (ONGC) has fixed a target of producing 314.67 million tonnes of oil and gas, for the eighth plan, keeping in view the production from existing fields and the large number of discoveries both onshore and offshore.

An ONGC spokesman said that the ONGC was poised for achieving excellent results, as it was likely to produce 143.97 million tonnes of crude oil against its target of 143.68 million tonnes of crude oil by the end of the first three years of the 7th plan and it had already produced 83.28 million tonnes against the target of 82.1 million so far.

During the seventh plan, the ONGC envisaged a total production of 173.5 million tonnes indicating a 90 per cent increase in production over the previous plan period.

Production was expected to go up by four million tonnes during the last two years of the plan 1988-90, and its success could be attributed to new oil and gas discoveries at Gandhar and Dahej in Gujarat, Narimanam, Kovilkaappal, Bhuvanagiri and Nannilam in the Cauvery Basin and Chanhmalgan in Assam, the spokesman said.

Besides, a series of hydrocarbon strikes in the western offshore like P-22, C-24, D-18, D-1 and 2, and the GS-1 structure in Krishna-Godavari offshore and Agartala dome structure in Tripura were the major finds, he said.

Introduction of early production system (EPS) and enhanced oil recovery (EOR) methods had not only helped in boosting production but had also reduced the time lag between the oil strike and subsequent development of the fields, the spokesman added.

The ONGC had made a profit of Rs. 1,507 crores in 1987-88 despite the price payable for crude remaining stagnant since July 1981 and it had paid a record dividend of Rs. 40.28 crores, highest ever by a public undertaking, he added.

HL permitted to shift catalyst unit

Hindustan Lever Ltd. has received government consent to shifting of nickel catalyst capacity from Bombay to Talaja in Raigad district.

Investment involved in the shifting of 800 TPA capacity is Rs. 265 lakhs, which will be met from internal accruals of the company.

The government has noted that with the proposed change of location the capacity of the company for nickel catalyst will remain the same as at present. Further, the unit is being shifted to a category 'C' centrally backward area.

The official order has, however, imposed certain conditions on the company. That is, it will surrender the power connected load of 164 KW in respect of catalyst plant at Sewri. The company shall not use the vacated land for any industrial use without the prior permission of the state government. Labour dispute, if any, shall be settled to the satisfaction of the state labour commissioner, the company shall take effective steps to prevent water, air, soil pollution in the new location

After shifting to Raigad, capacity shall not exceed the already sanctioned capacity and that it shall dismantle the existing plant at Sewri catering to the production of nickel catalysts.

The company is a dominant undertaking in the manufacture of soaps, glycerine and STPP. Fifty-one per cent of the equity in the company is held by the Unilever, UK.

GLINDIA PRODUCTS MAY FACE ANOTHER BOYCOTT

Products of Glindia Ltd., may be boycotted again in Bombay. This time the main grouse of the pharmaceutical trade against the company is restricted supplies of its products to most of the wholesalers.

Trade sources in Bombay said that the company is giving full drug supplies to only six wholesalers while the remaining eight wholesalers are getting only 10 per cent of their normal supplies.

The sources alleged that the company is wilfully cutting supplies to majority of wholesalers for their participa-

tion in their stir against Glindia products when the trade stir was on. This would be strongly opposed.

Retail druggists and chemists association and pharmaceutical wholesalers association representing retail and wholesale trade in Bombay and Thane have thus decided to boycott new products of Glindia as a first step. The company has two new products in the pipeline which are scheduled to come in the market shortly. The trade has already warned the company to stop such discriminatory practices.

It is to be recalled that an agreement between All India Organisation of Chemists and Druggists and Glindia was reached only on September 13 after a prolonged agitation in many parts of the country.

A company source however denied any curtailment of supplies of Glindia products to any wholesalers or stockists. If there is any drop in the availability of Glindia products to retailers, it is because the retail chemists are not buying the company's products from wholesalers who did not participate in the stir.

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Drug trade margins

Says The Financial Express in an editorial.:

The Hathi Committee had suggested the use of post offices, kerosene depots and so on for the sale of drugs in remote areas. This was more than a decade ago. The subsequent period has witnessed the tightening of rules governing the sale of drugs. This is as it should be, as many drugs have to be stored and sold in a prescribed manner. Yet, the Pharmaceutical and Allied Manufacturers' and Distributors' Association Ltd. (PAMDAL) has favoured relaxation of restrictions on the sale of drugs. Addressing the annual general meeting of PAMDAL, its President, Mr. George Daniel, has urged the Government "to amend drug rules to enable general merchants to stock and sell household remedies." Those who have gone through the harrowing experience of not getting drugs because of the boycott of manufacturers by chemists will readily support this suggestion. As the majority of chemists nonchalantly sell even prescri-

ption drugs in the same manner as they sell over-the-counter products, it will not be easy to draw a dividing line between household remedies and other drugs. This problem will not arise if qualified people are encouraged to set up their own shops to sell drugs. Steps must also be taken to resolve the recurring dispute between manufacturers and chemists over trade margins.

Mr. Daniel says that "distribution is a natural extension of the production function." Yet, the Government has not paid as much attention to distribution as to production. He is right when he says that the relative neglect of distribution has manifested itself in the form of a confrontation between manufacturers and distributors. The conflict could possibly have been avoided had trade margins been fixed on the basis of comprehensive data on the cost of production. The govt. has assessed the cost of production of drugs from

time to time while fixing prices. A similar exercise in respect of the cost of distribution is, however, yet to be taken up. Not surprisingly, trade margins fixed by the Government from time to time have given rise to disputes between manufacturers and distributors. The situation has deteriorated so much that the people at Parbhani in Marathwada, a backward area in Maharashtra, demonstrated against chemists as their boycott of certain manufacturers caused the death of a couple of patients. In the circumstances, the Government has done well to set up a committee headed by Dr. I.Z. Bhatti, Director-General, National Council of Applied Economic Research, "to undertake a detailed and comprehensive study of the pattern of trade margins in the pharmaceutical industry." As many chemists sell food products, cosmetics and so on, besides, of course, medicines, the Government expects the Bhatti Committee to study the "pattern of trade margins obtaining in other related industries." It is to be hoped that the Bhatti Committee will provide a lasting solution to the problem of drug trade margins.

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MEASLES SERUM:**Bengal Immunity to get UNDP aid**

United Nations Development Programme (UNDP) has before it a proposal from the state-owned drug manufacturing company, Bengal Immunity, for assistance to develop serum for measles.

Giving that information, Mr. Gamil M. Hamdy, resident representative of UNDP in India, told newsmen that UNDP had earlier provided assistance to the same firm for developing anti-malarial drugs and the result had been superb. Mr. Hamdy was all praise for the scientists in Bengal Immunity who, according to him, could be compared to the best talents available anywhere in the world. "The project we assisted is a fine specimen of a very successful job" he observed.

However, as Mr. Hamdy explained, UNDP did not provide direct monetary assistance for which there are other UN agencies and multilateral bodies. UNDP on the other hand sponsored experts, financed acquisition of equipment and arranged training programmes. "But nothing is done bypassing the government of the country where we operate," he said. "Unlike many other international bodies, we do not have our own priorities instead we work within the framework of national development objectives in accordance with priorities set by the concerned government."

In India, Mr. Hamdy pointed out, UNDP proposed to spend about \$168 million during the five year period 1985-90. The bulk of the amount had already been committed to various projects, he said.

Among UNDP-assisted on-going projects in West Bengal, were training programme at the Geological Survey of India, Jute Research and Development Programme at India Jute Industries Research Association, development of amorphous silicon solar cells at the Indian Association of the Cultivation of Science, Plant Improvement using modern biotechnology at Bose Institute and application of molecular biology and biotechnology to study parasites

in Indian Institute of Chemical Biology.

UNDP which has so far concentrated mainly on government agencies now proposes to finance projects, which will help governments formulate policies conducive to private sector growth. This is because many developing countries now recognise that private enterprise can be an important factor in development process and an increasing number of them are expressing greater interest in expanding the role of the private sector.

Asked if any private sector firm could now obtain assistance from UNDP directly, Mr. Hamdy replied in the negative. He made it clear that proposals for assistance, no matter whether from private or government firms, must be routed through proper channels and approved by the department of econo-

mic affairs of the government of India. Even state government projects seeking UNDP assistance must be routed through the appropriate authorities of the assistance of the Central government, though initial negotiations for assistance might take place bilaterally.

Besides, as Mr. Hamdy pointed out, UNDP would be more interested in assisting private sector projects only if the benefits of such assistance were available to a large number of units and not limited to any particular company.

UNDP's seminar in Madras, Mr. Hamdy said, revealed the need for assistance to SSI units. Similarly the Bombay seminars underscored the need for assistance for export promotion. The one recently concluded in Calcutta emphasised better understanding of the role of each partner in the production process, namely, the management and labour. "We will be too happy to lend our support to that adjustment process," he added.

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Chemicals, drugs exports up 76 pc.

The export of basic chemicals, pharmaceuticals & cosmetics has registered a 76 per cent increase at Rs. 273.42 crores in the first four months of the current year (April-July, 1988) from the level of Rs. 155.15 crores, achieved in the same period of the previous year.

Among these items, export of dyes and dyes intermediates, organic and inorganic chemicals and cosmetics export more than doubled during the four months period of the current year as against the export performance in same period of the previous year.

Dyes and dyes intermediates export touched a figure of Rs. 63 crores in April-July period of the current year as against an export of Rs. 31 crores in the same period of the previous year.

Export of organic and inorganic chemicals amounted to Rs. 36 crores in the four months period of the current year as against Rs. 15 crores achieved in the same period of the previous year.

Cosmetics export also doubled at Rs. 40.36 crores in the April-July period of the current year from the level of Rs. 20.98 crores achieved in the same period of the previous year.

Export of bulk drugs, formulations and medicinal castor oil touched a figure of Rs. 100 crores in the four months period of the current year as against

only Rs. 64 crores achieved in the same period of the previous year.

NOCIL DENIES ALLEGATIONS

National Organic Chemical Industries Ltd., (NOCIL) has denied the allegations made by the Collector of Central Excise in his show-cause notice dated September 23 that the company has been declaring the assessable value of ethylene lower than the actual cost of the product.

In a press release NOCIL claimed that the findings of the Collector was based on the basis of 'ethylene sole cost method' while the actual cost of ethylene will have to be calculated on the basis of joint products cost since the company produced basically two main streams of products (ethylene and propylene) from a single raw material, naphtha.

The joint costing method, the release stated, is prescribed by the Government in Para 14 of the Schedule I of the Cost Accounting Rules and is a recognised international practice. If this method of joint costing is considered, the cost of ethylene to the company is much lower than the price at which it sells it to any of its customers including PIL.

NOCIL had been filing its price list with the excise authorities, along with the copies of its agreement with PIL, from time to time and these price lists have been approved by Central Excise authorities after careful scrutiny of the agreement and the escalation factors incorporated therein.

HINDUSTAN ORGANIC

Hindustan Organic Chemicals (HOC) has plans to set up, at Rasayani, a 30,000 tonnes per annum formaldehyde plant at an estimated cost of Rs. 9.2 crores. The company is also actively pursuing the proposals to set up a 33,000 tonnes per annum caustic soda/chloride plant costing about Rs. 40 crores and a polyurethane complex costing about Rs. 150 crores for manufacturing 10,000 tonnes per annum each of TDI, MDI and polyurethane systems.

Presenting the audited accounts for 1987-88 at the annual general meeting held in Delhi, Mr. H. Krishnamurthy, Chairman and Managing Director of the company said that the performance of the company during the year had been excellent with new all time high records in production, sales, exports and profits.

Sales during the year went up to Rs. 127 crores against Rs. 85 crores last year, an increase of 50 per cent, out of which 34 per cent was due to the new unit at Cochin.

The value of export zoomed to Rs. 648 lakhs, a growth of 42 per cent over the previous year. The operating profit went up to Rs. 21.69 crores compared to Rs. 20.51 crores last year. The net profit after depreciation and interest was Rs. 987 lakhs against Rs. 852 lakhs, an increase of 16 per cent he said.

The company has declared a dividend of Rs. 173 lakhs for payment to Union Government the Chairman added.

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Gas units seek concessions

Addressing an AIGMA seminar on "Gas industry — its techno-economic aspects" in Calcutta recently, Mr. S. B. Budhiraja, managing director, Indian Oxygen Ltd., suggested various measures which the government can take to accelerate growth in industry. These include support by way of power subsidy, easing import of hardware for gas applications and allowing import of machinery and distribution equipment needed to reduce operational costs. These steps would help industry to increase volumes, investment and profitability, he added.

Apart from the policy aspect, Mr. Budhiraja said any future approach by the industry will have to be market driven. Industry must innovate production and distribution technologies, find new applications, establish economies under Indian conditions and convince the customer about the need. This is imperative as the gas industry is faced with competition from alternative processes. In this context, he cited applications like food freezing, oil well stimulation and effluent treatment where alternative processes are well established.

Admitting that growth was being hampered due to various unfavourable conditions, like uneconomic capacity, dominance of public sector, captive air separation units (ASU), too many operators, slow growth of applications and high cost of inputs, he pointed out there were also many favourable factors. These include a vast domestic market and the advantage of not having to utilise resources for basic R and D work which has made substantial progress in the advanced nations. What industry has to do is to identify the need and undertake the required developmental work, he said.

In his inaugural address, Mr. T. V. S. Sastry, managing director of Bharat Heavy Plates and Vessels Ltd., said although the demand for industrial gases is expected to increase by 12 per cent in the coming years, the gas industry is unlikely to benefit as most core industries have captive plants.

However, he pointed out that there were many new growth areas which industry could tap if it sets up units with multi-product gas plants. Some of the areas mentioned by him include oxygen in coal gassification, effluent treatment,

paper and pulp industry, fish farming and lime kilns; nitrogen in oil recovery, food freezing, space application and super conductivity, argon in steel making, and special gases for semi-conductors and micro electronics. It is up to industry to respond to these challenges, he added.

Dismissing claims that imported plants are more efficient and cost-effective, he said indigenous manufacturers have come out with plants upto international standards.

In this connection, he advocated co-operation between the plant manufacturers and the gas industry.

U.S. TO CLEAR SALE OF SECOND SUPER COMPUTER

India's request for the import of a second super computer for use by the Indian Institute of Science at Bangalore will be processed expeditiously following a meeting in New York between the U.S. Secretary of State, Mr. George P. Shultz and the Minister of External Affairs, Mr. P. V. Narasimha Rao.

Both met over breakfast at the U.N. Plaza Hotel and had discussions for over an hour on bilateral and global issues. They reviewed the development of bilateral relations and fledging co-operation in the area of defence technology.

The U.S. is participating in the Indian project for the manufacture of light combat aircraft and an agreement for technological cooperation has already been signed by the two countries. There were also discussions on other items of promised U.S. supplies to meet some systems and components requirements for the Indian Navy and Air Force.

S & T cooperation

It was noted by the two sides that cooperation in the area of science and technology was also proceeding satisfactorily and that U.S. President's Science Adviser, Dr. Graham, was already in India to discuss the extension of the science and technology initiative as well as its enlargement.

Mr. Shultz was assisted in the talks by Mr. Richard Murphy, Assistant Secretary of State, and Mr. Howard Schaffer, Deputy Assistant Secretary of

State for South Asia. On the Indian side, Mr. Pratap P. Kaul, Indian Ambassador in Washington, and Mr. C. R. Garekhan, permanent representative of India at the U.N., were present.

SPIC BAGS EXPORT ORDER

Spic has bagged an export order from Indonesia for about 3,200 tonnes of caustic soda lye worth Rs. one crore.

This is the first time that caustic soda lye which is a liquid cargo is being exported from this part of the country. The order has been bagged in the face of global competition.

The product has been produced in the chlor-alkali plant at Manali recently taken over by Spic from Kothari industrial corporation limited. Spic has been able to increase production and the increased production is being used for export.

Caustic soda lye does not enjoy any export incentive. Mr. V. Sundararaman, a spokesman for Spic's heavy chemicals division, said that the company had applied to the government for 15 per cent CCS. The proposal also had the backing of Chemexil. If a cash incentive was available, it would be possible to export larger quantities of caustic soda lye and also supply the product on deemed export basis to some of the Indian consumers importing the item against export entitlement.

KESAR ENTERPRISES TO EXPORT ALCOHOL

Kesar Enterprises, a company in Kilachand Devchand group, has entered into a tripartite agreement with All India Distributors' Association and a French firm for an initial export of about 25,000 tonnes of alcohol from U.P. distilleries. The All India Distillers' Association which has been authorised by the government to arrange export of alcohol from U.P. has selected Kesar Enterprises to act as an exporter. The company has built up storage facilities at Kandla port and possesses the necessary expertise for exporting alcohol. The deal, besides earning for the country a handsome foreign exchange of over Rs. 10 crores will also help in solving the problem of heavy accumulation of stocks.

Philips Carbon Black to modernise

Philips Carbon Black Limited (PCBL) will be embarking on an expansion-cum-modernisation programme with a view to totally revamping its factory in Durgapur in West Bengal. Indicating this in Calcutta, the vice-chairman of the company, Mr. P. K. Gupta, said an investment of between Rs. 15 crores and Rs. 20 crores, over a period of three years, was being envisaged for the programme.

Addressing shareholders at the company's annual general meeting, the vice-chairman said the technology acquired by the company from Columbian Chemicals Co. of the US had helped in increase productivity of the plant. The management proposed to further improve the efficiency of the unit by installing Microprocessor-based Control Systems which would also improve the quality of the product. While the licensed capacity of the plant was presently 40,000 tonnes per annum, there were plans to approach the government for an enhancement in capacity to 50,000 tonnes per annum.

Mr. A. R. Burkart, director of the company, said that Columbian Chemicals of USA, would be willing to consider participating in the equity of the company when PCBL became a net exporter of carbon black. Mr. Burkart felt that only then would it make sense to invest in the company. In the meanwhile, PCBL would continue to receive technological assistance and also market Columbian's range of industrial carbon blacks in India.

Mr. Gupta said that during the year ended March 1988, production increased by seven per cent on an annualised basis, the quantity of sales by 10 per cent and sales value by 13 per cent. Profits after tax at Rs. 1.21 crores, rose by 52 per cent. The availability of feedstock continued to pose a problem for the carbon black industry with extra costs being incurred in bringing feedstock from the more distant refineries. The capacity utilisation of the plant was 84 per cent.

Replying to shareholders questions, Mr. Gupta said the cost of spares and stores had gone up by 38 per cent, mainly because of the rise in prices of materials. Some expenditure had also been incurred on account of additional equipment, in the form of a captive

power plant and boiler, which had been installed at the factory during the past year, he added.

Commenting on the performance of the company during the first five months of the current year, the vice-chairman said production was up at 14,683 tonnes as against 12,717 tonnes in the corresponding period of the previous year. The company had sold 15,788 tonnes as compared with 13,603 tonnes and realised an increased value of Rs. 32 crores as against Rs. 25 crores. As such, PCBL's performance was expected to be much better in the current year.

During the year ended March 1988, sales stood at Rs. 65.01 crores as against Rs. 76.42 crores in the 16 month-period ended March 1987. Profit before taxation was Rs. 2.21 crores as compared with Rs. 2.01 crores while profit after taxation was up at Rs. 1.21 crores from Rs. 1.07 crores. A dividend of 18 per cent was declared.

CARBON BLACK UNITS : FEEDSTOCK IMPORT MAY BE ALLOWED

The carbon black industry might soon be allowed to import feedstock, it is reliably learnt. A proposal to this effect is at present under the consideration of the government and industry sources feel that it would materialise shortly.

Representatives of carbon black industry have been holding a series of dialogues with the Centre from the beginning of this year in a bid convince the government that import of feedstock would benefit the carbon black industry and also save foreign exchange for the country.

At a recent meeting of the rubber development council, representatives of the union government are understood to have agreed in principle to the suggestion of the industry that feedstock and not carbon black should be imported. Besides minimising the shortage of feedstock, this would also enable indigenous manufacturers to export the finished product. However, if the proposal is to be implemented it would require some coordination bet-

ween the ministries of petroleum and industry, which deal with feedstock and carbon black respectively.

Industry sources point out that it is only the lack of interaction between the concerned departments which is delaying the move. Nevertheless, they are hopeful that the proposal will be finally cleared. They also feel that the import of feedstock should be permitted under OGL and not be canalised through any agency. Besides, in their view, the government should exempt the imports from countervailing duty. At present carbon black feedstocks are supplied by Indian Oil, Nocil, Hindustan Petroleum, MRL and Indian Petrochemicals Ltd. The total supply is estimated at around 3 lakh tonnes per year and the shortage is between 45,000 and 50,000 tonnes.

The installed capacity of the carbon black industry is 1.9 lakh tonnes against the demand of 1.35 lakh tonnes. Because of the shortage of feedstocks the indigenous units are not in a position to meet the domestic requirement.

RS. 4-CR. STC AID TO AP BULK DRUG UNITS

The State Trading Corporation (STC) has agreed to extend Rs. 4 crores assistance (hold-on-credit) to bulk drug manufacturing units in Andhra Pradesh. This amount will be disbursed through the AP State Small-Scale Industrial Development Corporation (APSSIDC) which will provide warehousing and other facilities to the manufacturing units.

Two bulk drugs, sulphamethoxazole and mebendazole, are proposed to be covered under this price support scheme.

Discussions were held in Delhi recently by Mr. V. K. Srinivasan, Vice-Chairman and Managing Director, APSSIDC and Dr. S. S. Varaprasad, President, Drug Manufacturers Association of AP with Mr. M. Y. Priyolkar, Chairman, STC, Mr. A. K. Sen, Executive Director, and Mr. R. V. Reddy, group General Manager together with Mr. G. P. Rao, Joint Secretary, Commerce Ministry, in giving a final shape to the scheme which has been welcomed by the SSI units in Hyderabad.

Chemical industry asked to assess impact on environment

The Union Industry Minister, Mr. J. Vengala Rao today called for an evaluation of the social cost benefit of the chemical industry in view of the public reservations over its long-term impact on environment.

Inaugurating a one-day national seminar in New Delhi on "Chemicals, petrochemicals, pharmaceuticals and pesticides" to commemorate the 40th anniversary of Independence and birth centenary celebrations of Jawaharlal Nehru, Mr. Rao said there had been a debate in the recent past whether the social cost benefit of chemicals had been really positive in the long-term because of the industry's effect on environment. This perception had grown despite the fact that chemical industry had made a significant contribution to the country.

The Industry Minister wanted the industry to accept the challenge of tackling the hazard/environmental factors while evaluating the technological options in terms of cost benefit. While the industrial licensing policy had been liberalised in the recent past, the chemical industry itself should identify action areas for future development so that India could be on par both quantitatively and qualitatively in this sector with the developed world, he said.

Delivering the keynote address, Mr. Sam Pitroda, Adviser to the Prime Minister on Technology Missions, said chemicals and petrochemicals touched every aspect of life and like

electronics it was also going to be the industry of future. Biotechnology would play a very important role in the next 20 years.

Mr. Pitroda said there should be a proper maintenance of assets and an integrated management information system. The availability of right information was very critical. Though it had been talked about in all public sectors there was no sign of its implementation, he said.

The seminar discussed various aspects of chemicals and related industries in four sessions. The first session discussed a paper on chemicals presented by Mr. H. Krishnamurthy, Chairman and Managing Director of Hindustan Organic Chemicals. The session concluded with the suggestion for appointment of an expert committee to coordinate planning of the availability of feedstocks and their end-uses.

The session on petrochemicals dealt extensively with future scenario of basic building blocks such as ethylene, propylene and benzene. It called for the creation of a Petrochemical Promotion and Development Authority and Petrochemical Data Services.

The session on pharmaceuticals noted that the demand for drugs in the country by the end of the century would be worth between Rs. 16,000 crores and Rs. 20,000 crores. The last session traced the history of pesticides industry in the country and suggested that a new approach

based on biotechnology was essential to provide significant alternative to traditional methods of making and using pesticides.

Petrochemical Institute planned:

The Government is planning to set up a Petrochemical Institute, the first of its kind in Asia, to conduct courses in this subject and award degrees and diplomas. The institute, which could be on the pattern of the IIT, besides giving inhouse training to persons already working in the industry, will also provide a national base for conducting research in petrochemicals.

Mr. H.K. Khan, Secretary, Department of Chemicals and Petrochemicals in the Ministry of Industry, told a news conference that a committee under the chairmanship of Mr. Lovraj Kumar, former Petroleum Secretary, had been set up and it would give its recommendations by December this year. While the location is yet to be decided, the funding of the institute would be met jointly.

Petrochemicals: Demand May outstrip supply

The current estimates about the future demand-supply gap in the petrochemicals sector have shown that at least five to six new crackers and about five aromatic complexes would be needed to be set up in the country by the turn of the century.

The crackers and aromatic complexes are expected to take care of the demand-supply gap that is likely to emerge by the end of the Ninth Plan.

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According to the estimates, the demand-supply gaps by the year 2000 would be 15.99 lakh tonnes for ethylene, 6.35 lakh tonnes for propylene, 0.81 lakh tonnes for orthoxylene, 4.98 lakh tonnes for benzene, 2.11 lakh tonnes for paraxylene, 5 lakh tonnes for LDPE, 4.63 lakh tonnes for HDPE, 3.28 lakh tonnes for polystyrene 0.67 lakh tonnes for polyester, 3.29 lakh tonnes for DMT/PTA and 1.14 lakh tonnes for LAB.

The Government has identified only six major complexes for implementation in the Seventh and Eighth Plans and with resources from both the State and private sectors. These are, with the investment figures in brackets, Maharashtra Gas Cracker Complex (Rs. 1,533 crores), an olefinic complex at Hazira (Rs. 2,000 crores), an olefinic complex at Vizag (Rs. 1,800 crores), an aromatic complex at Madras (Rs. 800 crores), an olefinic complex along the HBJ pipeline (Rs. 2,000 crores) and an aromatic complex at Saleempur (Rs. 800 crores).

The estimates also show that the present scenario for petroleum feedstocks is not very encouraging. It is thus envisaged that the country would have to switch over to gas crackers, moving away from naphtha crackers.

An interesting element in the Government's identification of the petrochemical complexes to come up in the Seventh and Eighth Plans is the fact that the proposed petrochemical complex at Haldia has not been mentioned at all. In all the earlier documents, the Government included the Haldia complex as one of the projects to be set up in the near future.

With no signs of the major hurdles before the Haldia complex being cleared, this may well indicate the Government's move to drop Haldia from its scheme for developing the petrochemicals industry during the next Plan.

An official paper, presented at the seminar underlines the need for constant examination of the economics of petrochem. products vis-a-vis conventional materials and competitive products. Also a set of incentives through fiscal policy measures and pricing need to be initiated to egg on consumption.

The paper has identified four key areas for use of plastics, namely agriculture, automobiles, teletronics and building and construction.

Other areas, where plastic use could be increased includes education, health, recreation, communication and household sectors.

Poly Shift Will Boost Chemical Exports

Exports of chemicals and allied products, presently estimated at Rs. 1,000 crores, could go up by five times by the turn of this century, if a strategy to export only value added products and not the basic chemicals and intermediates is evolved.

This was one of the conclusions reached at the seminar.

It has been recommended that optimal capacities for new plants should be fixed if the export market is to be captured. In fact, it is also recognised that for effective penetration into the export markets, stringent quality standards have to be prescribed and effectively ensured. Delivery schedules should also have to be met.

It is felt that new applications would have to be promoted in the domestic market and the organised

sector would have to take a lead in this regard. Linkages should also be established between the domestic prices of critical feed-stock, like naphtha, with international prices so that Indian products could be competitive.

The seminar further recognised that there is need to review available feed stock resources for this sector, including renewable sources, so as to ensure optimisation of their conversion into building blocks.

The seminar felt that the chemical industry is on the threshold of achieving new frontiers, and hence this is appropriate time for introspection.

In this context, it is felt that attention has to be paid to removal of distortions in the approach to various areas like resources management (both human and material resources), project management, establishment of effective management information system and a good data bank.

Research and development has been recognised as an important part of this sector. In this connection, it is suggested that there should be some linkages between prices of major inputs with the pricing policies for end-products, particularly in respect of items like pharmaceuticals, which are subjected to administered pricing.

This would ensure generation of appropriate resources for encouraging research and development. It is also concluded that there is a wealth of talent indigenously available which needed to be nourished and effectively utilised. This would promote indigenous technological innovation and would encourage indigenous industry to utilise them effectively and fruitfully.

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Seydel chief feted

Mr. Raimundo L. Mejia, President Seydel International, INC., USA, was felicitated by M/s. Indokem Ltd; Bombay on 20th Sep. at Bombay Seydel, U.S.A. are the Indokem's collaborators for the manufacture of Seycofim PE-200 (synthetic resin — substitute for PVA) and SICO 12 (an effective substitute for mutton tallow). Leading luminaries from the textile industry graced the function. Mr. Mahendra Khatau, Managing Director of Indokem Ltd. welcomed Mr. Mejia and other invitees.

In his brief welcome speech Mr. Mahendra Khatau said: "Since last two years, there have been lot of interaction between Seydel and us. We have started introducing many new products for the textile industry. I am glad to say that these products have been successful in many units here. However, there is still a lot of progress to be made. We are continuously in touch with Seydel to get new products, processes and technologies for the Indian textile industry. I am happy to say that the response we got from the industry is really over-whelming. I do hope that we continue to interact with each other to better our mutual ties.

Mr. Mejia

In this short talk to the audience. Mr. Mejia was happy to be associated with Indokem. He said.

"There is a tremendous opportunity in this country to produce top quality fabrics for the export market. Only few countries like Taiwan, Korea and Japan have the potential technical expertise. India too has the expertise. Indian technicians are very much on par with these countries. You have the ability to convert the textile industry into a primary industry. We are here with

a different attitude i.e. teamwork, which is very successful with our worldwide contacts. We would like to cooperate with you in more than one way i.e. a traditional supplier/buyer relationship.

"When you consider sizing for high density export quality fabrics, the rules change. The relationship you have had with your traditional suppliers, like supplying cheap and supplying them in time, does not bother me. We are here prepared to collaborate with you and to work with you. Our research laboratories are completely at your disposal. It is not that service we give you before sales, will not be there afterwards. In fact our after sales service is superior.

"The Indian textile industry is very much cost-conscious and we respect it. We would like to have an opportunity to prove to you that increase in efficient quality control would ultimately pay off. We can only do these with real co-operation. We need to know your problems. We are professionals, the Indokem group is one of the best professional group. Our association with Indokem is doing very well. In the next few years, we are going to play a very important role in the conversion of the weaving industries into major textile industries worldwide".

SELF-SUFFICIENCY IN ALUMINIUM

India will achieve self-sufficiency in aluminium by the end of the current Plan by producing 3.5 lakh tonnes which is the domestic demand.

This was disclosed by Mr. K.V.B. Pantulu, Managing Director of the public sector National Aluminium

Company (NALCO) at a news conference at Bhubaneswar.

Mr. Pantulu said of the 3.5 lakh tonnes of production, NALCO's contribution would be two lakh tonnes, as against its installed capacity of 2.18 lakh tonnes when fully commissioned.

Mr. Pantulu said NALCO, which produced 33,000 tonnes of aluminium during the first six months of the current year, and expected to produce another 42,000 tonnes during the next six months, was expected to register a total turnover of Rs. 350 crores this year.

He said NALCO was likely to achieve 100 per cent of the earmarked quantum of 3.75 lakh tonnes of alumina export during its second year of the operation this year.

Very high purity (VHP) aluminium produced in the company's Angul smelter plant would also be exported, contrary to press reports which were wrong, he said adding that a token export of 50 tonnes to its collaborating company Aluminium Pechiney, France, had already taken place.

Mr. Pantulu said NALCO, which started exporting alumina in January last to the US, Brazil, Norway, China, North Korea and Bahrain through its captive port facilities at Vizag, had so far made eleven shipments comprising 2.20 lakh tonnes.

He said NALCO had earned Rs. 70 crores worth of foreign exchange from alumina export during January-September this year. He claimed that its bauxite mines and alumina refinery at Damjodi in Koraput district had exceeded their production targets, and the smelter plant at Angul in Dhenkanal district had achieved over 99.7 per cent of metal purity.

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Scope for gas-based units in Rajasthan : OIL

Oil India Ltd. (OIL) has asked the Centre and the State Government to plan downstream facilities to utilise the gas discovered recently at Tanot in Rajasthan.

According to OIL sources, the natural gas discovered in the region is rich in methane, ethane, propane and butane. The hydrocarbon content of the gas which has been produced so far is 67 per cent, indicating that when the structure is developed there is excellent potential for gas-based industries in the region, including LPG extraction.

In fact, the Rajasthan State Electricity Board has already finalised the setting up of a 3 mw power generation unit at Ramgarh using natural gas. According to official sources, an LPG plant may also be set up there.

In the first well drilled by OIL at Tanot, natural gas was discovered in significant quantities. The well produced natural gas at a steady rate of 45,000 standard cubic metres per day and the open flow potential is estimated to be more than 140,000 standard cubic metres per day.

The prognosticated geological reserves of gas discovered by Tanot well No. 1 is of the order of one billion standard cubic metres. OIL is scheduled to drill in structures adjacent to the Tanot structure. It is expected that such exploratory drilling will lead to the discovery of larger quantities of natural gas in the Tanot area of Jaisalmer district.

The second exploratory well being drilled by OIL in Western Rajasthan is Ramgarh well No. 1, just 5 km north west from Ramgarh town. The well which was spudded in August this year is expected to be a deep one with a target depth of 5,200 metres. The drilling time for this well will be about six to eight months.

For the third well, OIL has planned to return to the Tanot area and drill a deep (about 5,000 metres) well to test the lower zones. Depending on the results of these three wells and the scientific data already available on OIL's lease areas, three more wells are planned in the first phase of OIL's Rajasthan project. The total drilling is expected to be 26,000 metres within a period of two to three years.

The total cost of survey phase of the project completed earlier has been Rs. 31 crores. The sanction for the drilling phase is about Rs. 51 crores and this will be utilised during the Seventh Plan period.

The foreign exchange component of OIL's Rajasthan project is being funded by a World Bank loan. The tentative allocation for this project is \$25 million.

The sedimentary basin within OIL's petroleum exploration licence (PEL) area is an extension of the Southern Indus basin of Pakistan, where a number of giant gas fields are on production. Recently oil was also discovered in Pakistan, south

west of OIL's PEL area. In the Jaisalmer-Mari High, ONGC has discovered gas in Maherra Tibba and Ghotaru and got indications of presence of oil in Sadewala.

Based on all available information, the prognosticated reserves in OIL PEL areas in Rajasthan have been estimated to be about 95 million tonnes. Out of this, Jaisalmer basin may have hydrocarbon reserves of 75 million tonnes and the Bikaner-Nagaur basin about 20 million tonnes. How much of these quantities could be commercial accumulation can be determined only after further drilling and testing of the wells.

MAHARASHTRA SSI LOCATIONAL POLICY REVISED

The Maharashtra Government has partially modified the existing industrial location policy in the Bombay metropolitan region to facilitate enhancement of investment limit on plant and machinery to both new and existing small-scale industry.

In the case of new units in approved industrial estates in zone I and zone II of Bombay metropolitan region, the investment limit will be allowed to be raised up to Rs. 35 lakhs. In the case of existing units, the investment limit has been allowed to be raised up to Rs. 35 lakhs on a one-to-one replacement basis as a part of modernisation/technological upgradation.

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HFC chief under fire

The public sector Hindustan Fertiliser Corporation Chairman and Managing Director, Mr. Sebastian Jacob's letter to the Department of Fertiliser has confused the country's policy-makers, who are anxious about the revival of this corporation, according to Mr. N.C. Sharma, General Secretary of the Fertiliser Workers' Federation of India.

The corporation has an accumulated loss of about Rs. 600 crores including last year's provisional loss of about Rs. 105 crores and an interest burden of Rs. 75 crores.

Reacting sharply to Mr. Jacob's observations about the state of affairs in various plants and about the general managers, deputy general managers and the employees as a whole, Mr. Sharma, said that when the Government has initiated steps to revive the corporation by revamping the three old plants — Durgapur, Barauni and Namrup — the chief executive's comments are unwarranted.

The commissioning of Haldor Topsoe of Denmark, Toyo Engineering of Japan and UHDE and Lurgi of West Germany by the Union Government reflects the gravity of the situation and urgency for revamping the units. Therefore, Mr. Sharma wondered what prompted the HFC chief to discredit the entire corporation's workforce on which he had heaped praises a few months ago for ensuring 65 per cent to 70 per cent production on an average.

Mr. Jacob's present stand is clearly a volte face. He and none else, is morally responsible for the deterioration, if any, and he should own

responsibility. The Government should treat his letter in proper perspective", he remarked.

Mr. Sharma said that Mr. Jacob's suggestion to bring in efficient and competent personnel from other undertakings for top-level posts in all the four units and for the marketing wing is nothing but a reflection on the competence and expertise of the present general managers and other senior executives down the line.

"Even the most efficient and experienced man in the chemicals industry would fail to get the optimum from any of these plants in their present stage of operation. Plants like Durgapur which should have been written off long ago is still being kept operational. There is no way out but to revamp these plants as suggested by the three foreign consultants," he said.

About the shifting of the marketing division, he said the most surprising thing is the HFC chief's suggestion to shift the wing from Calcutta to New Delhi and opposing the shifting of headquarters from New Delhi to Calcutta. When all the HFC plants were located in the eastern region there could be no sensible or plausible reason not to have the central marketing office in Calcutta, the nerve centre of the region.

It is intriguing, according to Mr. Sharma, at this crucial juncture when the revamping plans are lying with the Public Investment Board for detailed analysis and when the consultants have made firm commitments about full capacity utilisation

of all the plants why Mr. Jacob had written such a letter which instead of helping the Government would create avoidable confusion among the decision makers.

No one knows what would be the impact of this letter on PIB, he added.

The foreign consultants, according to him, have stated in their report that all the plants could be rehabilitated, with replacement of equipment and introduction of modern energy efficient technology. After the revamping, the capacity utilisation would be 100 per cent and energy saving would be 30 per cent. The revamping could be completed within three years with 30 weeks' plant stoppage.

After revamping which would cost around Rs. 1200 crores, the annual production would be 3.30 lakh tonnes each against the present 1.40 lakh tonnes in Durgapur, 1.42 lakh tonnes in Barauni and 1.48 lakh tonnes in Namrup respectively.

Significantly, all these plants would turn the corner and earn substantial profit; Rs. 16.52 crores by Durgapur, Rs. 10.68 crores by Barauni and Rs. 16.67 crores by Namrup against the projected losses (1978-88) of Rs. 42.96 crores, Rs. 50.49 crores and Rs. 22.95 crores respectively.

These plants were set in the early seventies at a total cost of Rs. 280 crores the book value of which has now come down to less than 20 per cent. The plants of the same capacity, if set up today, would cost around Rs. 2,500 crores. The revamping cost of these three plants, on the other hand, would cost Rs. 487 crores.

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Process plant equipment units seek duty drawback, CCS

Indian manufacturers of process plants and machinery, particularly for fertiliser and petrochemical projects, fear that the Union Government is not interested in helping them retain their competitive edge against overseas suppliers of such equipment. They cite the Government's attitude in allowing global tenders for equipment needed for such projects as adequate justification for their fears.

Citing the example of the recently-cleared Nagarjuna Fertilisers and Chemicals Ltd. (NFCL) as a test case, spokesmen of the Process Plant and Machinery Association of India (PPMAI) stated that the Government appears to be willing to let private sector companies float global tenders without allowing domestic manufacturers of process plants and machinery the benefit of duty drawback and cash compensatory support (CCS) as was done in the past. Without these benefits, they say Indian manufacturers cannot possibly compete against overseas suppliers bidding for such tenders.

They maintain that in spite of their representations made to the Government almost a year ago that domestic manufacturers be allowed duty drawback and CCS benefits when bidding for such global tenders, the Government had been dragging its feet in issuing a notification to this effect.

They point out that this is surprising especially in view of the fact that the Ministry of Agriculture, Department of Fertilisers had recommended to the Government's Department of Economic Affairs the granting of these benefits to indigenous bidders/manufacturers. PPMAI spokesman say that it is surprising that NFCL was allowed to float a global tender for fertilisers equipment over six weeks ago even before the Government could decide on this issue. NFCL spokesman, however, clarify that the reason why it decided to float such a tender at an early date was to prevent further delay as every day's delay would cost the project an additional amount of around Rs. 50 lakhs.

They point out that the project had been delayed by around two years already. Hence, when the association represented to the Government that its members had difficul-

ties in deciding the prices to be quoted in response to the global tender floated by NFCL, the company let Indian bidders quote with and without deemed export benefits", thereby enabling it to arrive at a decision as soon as the Government made clear its view on this subject say company sources.

PPMAI has also voiced serious reservations on the manner in which NFCL has been allowed to evaluate the bids without first opening them publicly as was the case in most other global tenders floated by Indian fertiliser companies in the past. They point to the case of the Kribhco project where the bids were publicly opened in Houston, US.

NFCL sources however, clarify that unlike the Kribhco and most other public/joint sector fertiliser projects, NFCL is a private sector project, and is the first large project being financed entirely by Indian financial institutions and commercial banks without recourse to multilateral credits from institutions like the World Bank, IFC and the Asian Development Bank. Hence they explain that the company decided to evaluate the bids in a manner which would allow the evaluators to get the most competitive offer from the bidders.

They also point out that the evaluation of the bids will be done in Rome by the company's project monitoring committee comprising senior representatives of the Industrial Development Bank of India (IDBI) the Commonwealth Development Corporation, UK besides representatives of Snam Progetti and PDIL, consultants to the project. That is why, the evaluation committee will also try to negotiate the prices offered by the bidders even after the bids have been submitted, which they explain, would not be possible if the bids were opened publicly.

According to PPMAI spokesman, however, unless the Government permits them the duty drawback and CCS benefits, Indian manufacturers will not stand a chance against overseas bidders. Their claim only reinforces their suspicion that the Government is in favour of large-scale imports, rather than letting Indian manufacturers compete more equitably.

They say that this will not only involve loss of business for them in respect of these fertiliser projects, but also in respect of export potential as they would be at a loss to explain to potential buyers of such equipment overseas, why their own country had itself bypassed them when placing orders from foreign suppliers. This, they point out, could be a severe setback to the export efforts made by the Indian capital goods industry.

Considering that the process plant equipment industry worldwide is already facing slump conditions (according to the PPMAI the industry worldwide has a capacity utilisation of just around 12 per cent on account of the closure of several nuclear plants all over the world), foreign suppliers have also begun offering dumping prices, while some Governments like that of Korea have even begun offering subsidies to this industry to compete more effectively in international markets. Against this competition, point out PPMAI sources, it is unfortunate that the Union Government is still dragging its feet on extending the facility of duty drawback and CCS as in the past.

RPG GROUP BID FOR SHAHJAHANPUR

The R. P. Goenka group is making a bid to enter the fertiliser field.

The group has submitted a proposal to the Government for setting up a gas based fertiliser plant at Shahjahanpur in Uttar Pradesh — a site where Apeejay Fertilisers of Swaraj Paul and Surendra Paul failed to put up its plant.

The bid is being made through Ceat Tyres, a company belonging to the R. P. Goenka group.

Another contender for the Shahjahanpur site is Mr. Krishan Kaushal, a non-resident Indian based in West Germany. Mr. Kaushal, who was here recently, discussed his proposal with Government officials.

A US-based non-resident Indian, Dr. B. Pande, is already in the fray for the Shahjahanpur site.

The other parties, which have also proposed a fertiliser plant at Shahjahanpur are Krishak Bharati Cooperative Ltd. (Kribhco), public sector Rashtriya Chemicals and Fertilisers and the private sector Oswal Agro.

FACT profit at Rs. 15.62 crores

Fertilisers and Chemicals Travancore Ltd. (FACT) has made a pre-tax profit of Rs. 15.62 crores during the year 1987-88. The company is now making profit for the fifth year in succession.

The operating profit for 1987-88 before prior period adjustments is Rs. 29.66 crores compared to Rs. 31.80 crores during the previous year.

Addressing the annual general meeting of the company at Udyogamandal on September 30, the FACT Chairman and Managing Director, Mr. N.B. Chandran, informed that the year under review, which was the silver jubilee year, had been marked by significant achievements in every sphere of activity such as production, marketing, project implementation and engineering services. This has led to consolidation and overall growth of the organisation, he stated.

The highlights of the year were record production of complex fertilisers, sulphuric acid and ammonium sulphate registering a capacity utilisation of 82 per cent, new milestones in sales in terms of volume and value and improved performance by the engineering divisions FE-DO and FEW.

The production of 123,629 tonnes of nutrient P_2O_5 during 1987-88 was the highest ever achieved recording a capacity utilisation of 82 per cent, the previous best being 120,187 tonnes achieved during the preceding year.

The production of nutrient nitrogen during the year at 227,124 tonnes corresponds to a capacity utilisation of 85 per cent.

The production of 553,870 tonnes of complex fertilisers was yet another record, the previous best being 542,364 tonnes in 1986-87. Total production of sulphuric acid at 521,248 tonnes was also the highest ever achieved, bettering the previous best figure of 456,453 tonnes in 1985-86.

The spectacular production performance, said Mr. Chandran, was achieved in spite of the power cut and old age of the plants at the Udyogamandal division. The trend continued during the first five months of the current financial year too during which period the overall capacity utilisation was 96 per cent. The FACT chief disclosed that the composite ammonia plant had completed 215 days of uninterrupted run on July 6. This was also a record since the previous longest run had been in 1987 with 152 days.

On sales, Mr. Chandran stated that the one million-mark was crossed for the first time in the company's history. The quantity sold was 10.81 lakh tonnes as against 9.10 lakh tonnes during the previous year. The sales turnover touched the peak at Rs. 369 crores including subsidy compared to Rs. 332 crores during the previous year, an increase of 11.14 per cent.

The FACT Engineering Design Organisation (FEDO) had performed

creditably with a turnover of Rs. 1220 lakhs which was 38 per cent higher than that during the previous year. Several prestigious projects like the LPG bottling plant for Hindustan Petroleum Corporation at Vijayawada, standby power source for Tuticorin Alkalies & Chemicals etc. were commissioned and handed over to the clients in 1987-88. FEDO had also secured fresh orders like the one for methanol plant of Gujarat Narmada Valley Fertiliser Corporation, effluent treatment project of Coramandel Fertilisers, desilication plant for the Hindustan Paper Corporation at Velloor and test facility for the Fluid Control Research Institute at Palghat.

FACT Engineering Works (FEW), according to Mr. Chandran, was on the path of growth and diversification during the year. The ammonium sulphate caprolactum project of FACT under implementation was nearing completion. The project had achieved 87.9 per cent overall progress, he added.

Rs. 1.65 Crores for DPR

The Union Government has sanctioned Rs. 1.65 crores for preparing a detailed project report on the proposal for setting up an ammonia plant at a cost of Rs. 253 crores at the Udyogamandal division of FACT.

Mr. Chandran said that Rs. 43 lakhs of the amount sanctioned would be foreign exchange component. The new plant, with a production capacity of 900 tonnes per day, was proposed to replace the ammonia plants at the division which were very old and obsolete.

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RCF's excellent performance

Rashtriya Chemicals & Fertilizers Ltd., has completed its first decade with an impeccable performance. RCF on its formation on 1st April, 1978, has gone from strength to strength over the last 10 years registering spectacular performance in all spheres of its operations. There has been a 7-fold increase in capacity expansion. The production, sales and financial performance have also registered a multi-fold increase during this period. The decade of the overall excellence pitches RCF at the pinnacle amongst all the companies in the Fertilizer Industry. **Operating Performance During 1987-88**

The year 1987-88 has ended for RCF on an exceptionally good performance never achieved in its early history. The production of fertilizer (Urea and both the complexes) placed at 23.13 lakh MT was 12.30% more as compared to the previous year's production at 20.60 lakh MT. The sales of fertilizers and Industrial Products also touched a new high at 21.10 lakh MT compared to 16.46 lakh MT of the previous year, establishing a growth rate of 28.3%. The value of the sales is placed at Rs. 905.33 crores as against Rs. 691.48 crores recorded during 1986-87 giving a growth rate of 31%. The gross profit zoomed to an all time high at Rs. 220.71 crores. After providing for Rs. 104.44 crores as depreciation and Rs. 50.65 crores as interest, the pre-tax net profit swings to Rs. 63.11 crores as against Rs. 20.11 crores achieved during 1986-87.

This feat comes against the backdrop of consecutive droughts gripping the country compounded by the turbulent glut situation and shrinking demand. The marketing situation was highly volatile and fierce and the company burdened with huge carry forward inventory of the last year, with excellent production results achieved during 1987-88, added unmitigated hardships to the Marketing personnel. Under such conditions, the sales of 21 lakh MT of fertilizers was an excellent performance and is an all time high record set by them in the history of the company and the Fertilizer Industry as a whole.

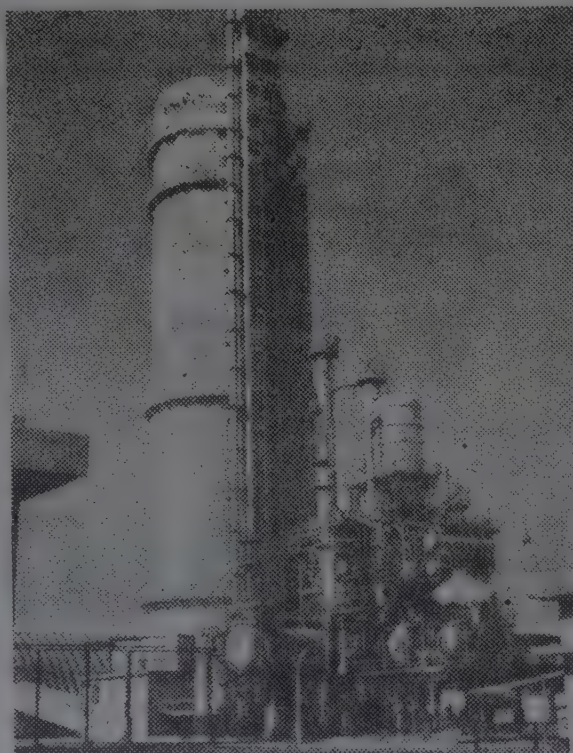
Production Performance at Trombay

The Trombay Fertilizer Plants produced 9.86 lakh tonnes of fertilizers including both Urea and both the complexes during 1987-88. The

Urea I and V achieved 102% and 80% capacity utilization. The rehabilitated Suphala plant produced Suphala (15: 15: 15) to the tune of 3,33,000 MT which is 111% of the capacity utilization. The ANP (20: 20: 0) was placed at 2,84,355 MT. The Trombay Ammonia Plant produced 3.36 lakh tonnes of Ammonia during the year.

The Methanol production at 41,716 MT registered a capacity utilization of 116% as against 36,015 produced in the previous year. The New Nitric Acid plant at Trombay received an all time high production record of 215,150 MT operating at a capacity utilization of 102%.

Trombay's Industrial Products contributed handsomely in boosting up the profits. Their performance has been superb. The production of Ammonium Bicarbonate — a vital input in the bakery industry is placed at 4411 MT giving a capacity utilization of 110%. The production of Sodium Nitrate/Nitrite is placed at 3926 MT as against 3830 MT produced last year. The Methylamines production was placed at 3096 MT against 2151 MT produced last year. The product is a vital input for the manufacture of life saving drugs, leather industry and pesticides.



Trombay Urea Plant Operating at 106% of the Capacity

Thal Production Performance

The performance of both the Ammonia plants of 1350 MTPD capacity

HIGHLIGHTS

- * New Production record set at 23.13 lakh MT.
- * RCF Sales cross the 2 million tonne mark.
- * Sales turnover swings to an all time high at Rs. 905.33 crores.
- * Gross Profit posted at Rs. 220.71 crores, with highest ever Net Profit achieved at Rs. 63.11 crores.
- * With this year's Dividend of Rs. 11.03 crores, the total Dividend paid to the Government of India so far stands at Rs. 75.94 crores.
- * Advance repayment of Government of India loans to the extent of Rs. 50 crores ahead of schedule.
- * Thal plants operate to the capacity utilization.
- * New thrust on R & D activities.
- * Modernisation and rehabilitation schemes progressing as per schedule.

and 3 Urea plants of 1500 MTPD each, have surpassed all the previous records and notched an excellent production during 1987-88. The production of Ammonia at 7,84,873 MT represents 85% capacity utilisation. The last year's production of Ammonia was 640,535 MT. The production of Urea at 13.28 lakh MT is the highest ever and represents 90% capacity utilization. The outstanding achievements of the plants was the record monthly production of 1,35,515 MT of Urea and 78,804 MT of Ammonia during December, 1987. These constitute 108% and 105% capacity utilization respectively. The highest daily production of 4,685 MT of Urea was achieved on 19th August, 1987 against the daily rated capacity of 4,500 MT. 13.8 lakh MT of Urea was despatched during 1987-88 which is an all time high record achieved so far.

Heavy Water Plant.

The Heavy Water Plant set-up at Thal on behalf of the Atomic Energy Commission, is fully stabilised and is operating very well as per the targets.

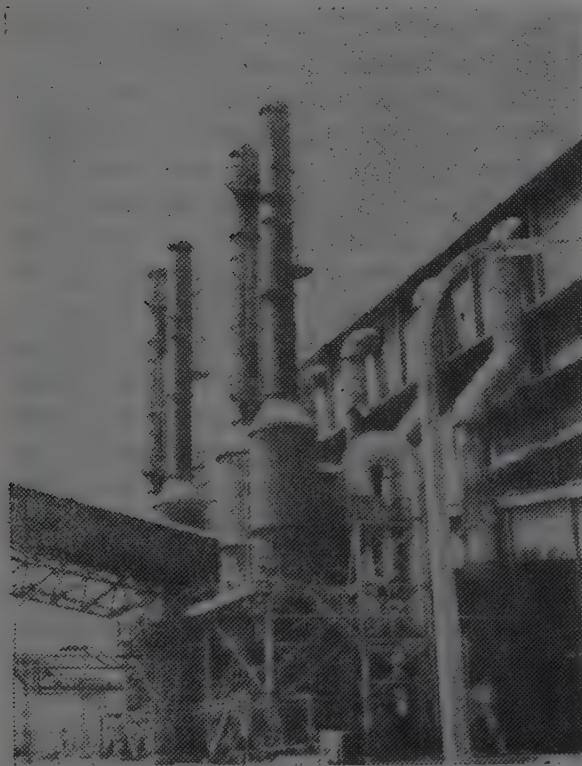
Computer Controls.

The use of modern communication and computing aids at the Thal Unit got a further boost with the introduction of Computerised Railway Receipts for despatch for the first time in the country. The whole

system was fully conceived, designed and executed by RCF's own Computer Centre. RCF has now offered to give this know-how to other Undertakings.

Marketing Performance.

RCF's Marketing Division performed exceedingly well, sold 21.10 lakh MT of fertilizers during 1987-88 as against 16.60 lakh MT sold during the previous year. As stated earlier, this was achieved in spite of severe consecutive droughts and volatile marketing situations. The company continued to make efforts to produce quality products and services to the farmers. The RCF's sparkling Urea and Complex fertilizers Suphala (15: 15: 15) in granules and Suphala (20: 20: 0) in prills enjoy unassailable reputation amongst the farmers.



Suphala (15:15:15) Plant Operating at 122% of the Capacity

Another striking feature of the Marketing Division was setting up of a "Farmers" Training Institute" at Nagpur at a cost of Rs. 50 lakhs in collaboration with the Punjabrao Krishi Vidya Peeth, Nagpur. The main objective of establishing this institute is to provide scientific training to the small and marginal farmers, particularly from the weaker section of the society and the women farm labour. This will also provide a package of modern farm practices developed by the Agriculture University towards quick transfer of technology at the village level.

Industrial Products.

The Industrial Products Division of RCF continued to forge full st-

ream ahead and registered an all time high sales turnover of Rs. 64.48 crores. Our company continues to be the co-ordinating agency for the imports of Ammonia for the Indian Fertilizer Industry and handled 4,66,000 MT of Ammonia during the year, 63 specially designed tank wagons were fully utilised for transport and Defence establishments throughout the country.

RCF exported 70 MT of Ammonium Bicarbonate to Egypt and Malaysia during the year under review. The company also assisted export of Methylamine based products i.e. isoproturon, Di-Methyl Hydrochloride and Dimethylamine Salt of Dacamba to Iraq, UK, France and USSR.

Research & Development.

RCF's R & D activities continue to gain momentum. After successfully commissioning a 50 kg/hr Ammonium Polyphosphate Unit, the job of designing and procurement of 500 kg/hr. pilot plant is in the advance stage of completion. The Unit is expected to become operational by October, 1988. The data collected and operational techniques developed for granulation would be utilised to design a commercial plant of 250 MTPD.

A bio-fertilizer laboratory has been set-up for research in Plant Tissue Culture and Bio-fertilizers. Work is on hand on superior varieties of Sugar-cane and medicinal plants.

RCF has set-up a bench scale facility for Urea Nitric Phosphate. This is a new product which mixes the P205 as a complex to calcium Nitrate and Urea in water soluble form without the use of Sulphuric Acid.

A collaborative project between RCF and the National Chemical Laboratory on coated Urea is in progress. Different formulations of coating agents have been tried on various crops to evaluate the effectiveness of this coating in improving the Nitrogen efficiency. The results obtained so far are encouraging.

Reverse Osmosis Plant.

RCF has acquired technical know-how for the Reverse Osmosis plant for water purification and desalination. A pilot plant of 5 M³/day has been successfully commissioned and is being utilized to generate information for designing such plants useful for different kinds of brackish water in the country.

Diversification Schemes/New Projects.

RCF's plan for new projects/diversification schemes include newsprint paper from Bagasse, Elastomers, Nitro Phosphate plant using direct low grade phosphate, phosphoric acid/DAP plant using sulphuric acid available from zinc lead smelter, Methanol and Dimethyl Formamide plant etc. The work on the Dimethyl Formamide plant has already commenced at Thal and will involve an investment of Rs. 6 crores. The product is mainly used in spinning of acrylic fibres. Besides this, the product finds an extensive use in the pharmaceutical industry, manufacture of synthetic elastomers and printing industry. This will save foreign exchange to the tune of Rs. 4.5 crores per annum.

Rehabilitation & Modernisation Schemes.

RCF's ambitious programme to revamp its 23 year old plant at Trombay at an outlay of more than Rs. 100 crores, is operating as per schedule. The Suphala (15: 15: 15) plant revamped at a total cost of Rs. 13 crores, is operating to its full capacity and has reduced gaseous emissions with zero discharge of liquid effluents.

The construction work of the modernisation of the old Ammonia Plant is going ahead as per schedule. The Rs. 67 crore project, expected to be commissioned by October, 1989, will reduce the present level of energy consumption with the induction of new process. The plant will be equipped with modern digital control systems in place of pneumatic controls. A scheme to modernise the old Urea Plant in phases, is also being implemented. This will reduce gaseous emissions, improve product quality and reduce energy consumption. The project with a total cost of Rs. 6 crores will be commissioned by March, 1989.

The existing Methanol plant is being modernised at a cost of Rs. 16 crores adopting the latest low pressure synthesis technology in place of the existing high pressure synthesis system. This will reduce the energy consumption by 30% and will optimise the plant capacity with lower maintenance cost.

Plant Optimisation.

RCF plans a major step forward in the use of computers for real time on line process optimisation. This computer aided manufacture of

Ammonia for energy and cost optimisation is being attempted for the first time in the country both at Trombay and Thal. A sum of Rs. 2 crores has been earmarked for the project.

Reversal of Urea Stripper.

Another major landmark achieved this year was the reversal of Urea Stripper at Trombay. This is the most vital equipment in the Urea plant and has to be replaced or reconditioned after some years of operation. This was a challenging job and the entire operation of reversal was completed in only 14 days which is a world record.

Dividend.

The company in its Tenth Annual General Meeting held on 27th Sep. declared a Dividend of Rs. 11.03 crores to be paid to the Government. With this recommendation the total Dividend paid to the Government since the incorporation of the company amounts to Rs. 75.94 crores — almost equivalent to $1\frac{3}{4}$ times the original equity of Trombay.

Diversification Plans:

As a part of Corporate Plan required for the year 1986-87 to 1990-91, RCF intends to diversify in the various fields, for which, preliminary studies have been made. The broad details of the projects envisaged for taking-up under the diversification scheme are as below:—

1. Bagasse based Newsprint project in association with SICOM. Location — Nimgaon in Sholapur Distt. Maharashtra.
2. 300 TPD Methanol Plant. Location: RCF Thal complex. Project cost Rs. 66.65 crores.
3. Elastomer Project in association with MPCL. Location: RCF Thal complex. Project Cost: 578 crores.
4. NPK plant in collaboration with Tamilnadu Industrial Development Corporation (TIDCO). Project Cost—Rs. 145 crores.
5. Electronic/MOS grade chemicals. It is proposed to manufacture Electronic/MOS grade chemical such as sulphuric acid, nitric acid, hydrogen peroxide etc. which are presently imported. Preliminary studies have been conducted and application for registration is under process. The broad details are as under:—
Capacity — Total 1000 MT/year of various chemicals and Project Cost—Rs. 50 crores.

Poly crystalline silicon for Semiconductor devices. Project Cost —Rs. 60 crores and Location — Suitable place in Maharashtra.

Financial Resources

The source of funds for finalising the new project will be from internal generation and from external sources by way of public deposit scheme and bonds.

Total internal resources that is available to be generated during Seventh Plan period — Rs. 436.00 crores; Less already committed — Rs. 263 crores; Net internal generation available for new project in Seventh Plan — Rs. 173.00 crores; Additional External deposits — Rs. 280.00 crores; Public deposits Rs. 155; Bonds Rs. 125/Rs.280 crores; From joint venture partners — Rs. 364.00 Total Rs. 817.00 crores.

EQUATED FREIGHT RATE 5 PC CUT ON FERTILISERS RESTORED

The government has restored the five per cent cut in the final equated freight rate for 1987-88 for nitrogenous and complex fertilisers.

In a communication to fertiliser companies, the fertiliser department has said that the Fertiliser Industry Coordination committee (FICC) has revised the final equated freight rates which restored the cut imposed earlier.

The industry has heaved a sigh of relief, since the five per cent cut in the equated freight would have seriously eroded its profitability. Industry sources say that the government has partially helped the fertiliser manufacturers improve their financial position.

The earlier communication of the government with the five per cent cut in equated freight had come as a surprise to the industry as these were the same as the provisional equated rates announced in January 1988.

There was about a 20 per cent increase in railway freight from December 1, 1986. However, until January 1988 no correction was made in the equated freight and freight subsidy; only provisional rates were announced for 1987-88 leaving a period of four months — December 1, 1986, to March 31, 1987 — uncovered.

Even in announcing the provisional freight rate after such a delay, the announced rates were not only below actual incidence during 1986-87 as claimed by the manufacturers, but also a cut of five per cent over the rates computed as reasonable by FICC was imposed.

EXPERT PANEL ON FERTILISER UNITS IN GULF SET UP

The Government has set up an expert group of chief executives of public and co-operative sector fertiliser companies to survey and explore the scope for joint ventures for production of fertilisers in the Gulf countries.

The group headed by Mr. Sebastian Jacob, Chairman-cum-Managing Director, Hindustan Fertiliser Corporation, has been asked to make its recommendations taking into account the availability of feedstock in the Gulf countries, the market potential in India, and other related factors.

The group has also been asked to make such recommendations as would facilitate the Government entering into joint ventures, if considered viable.

The other members of the group are: Mr. N.B. Chandran, Chairman-cum-Managing Director, Fertilisers and Chemicals Travancore Ltd., Mr. M.H. Avadhani, Managing Director, Indian Farmers Fertiliser Co-operative Ltd., Dr. K.K.S. Chauhan, Managing Director, Krishak Bharati Co-operative Ltd., and the Chairman-cum-Managing Director, Rashtriya Chemicals and Fertilisers Ltd.

The setting up of the group follows the interest shown by some foreign and Indian parties in setting up joint venture fertiliser plants in the Gulf countries to take advantage of the cheap natural gas available there.

One foreign party, which has shown interest, is Snamprogetti of Italy. The Indian parties reported to have shown interest in such joint ventures are Chabbrias and Birlas, besides some public sector companies.

There are many ifs and buts connected with the setting up of joint venture fertiliser plants in the Gulf. The price at which gas would be supplied by the Gulf countries, the form of equity participation, and the type of buy-back arrangements between the Indian and other partners are factors each of which will have a bearing on the economics of such ventures.

These will have to be studied in detail by the group which may have to visit some of the Gulf countries.

The group has been asked to submit its report within three months.

New chemicals, drug policy on cards

A new policy for petrochemicals, pharmaceuticals, pesticides and chemicals is being evolved to bridge the gap between availability and anticipated demand. Disclosing this at a press conference the Union secretary for chemicals and petrochemicals Mr. H.K. Khan, said that these thrust-area industries need special attention for future growth.

Although in the past 40 years, rapid strides have been made in these industries, more needed to be done to establish additional capacities to meeting the domestic demands and fulfil export obligations.

The secretary said the endeavour would be to identify thrust areas and chalk out details for achieving targets. The major area of concentration, it was evident from Mr. Khan's observations, was going to be petrochemicals, for which the government is planning sizeable increase in capacity.

Mr. Khan said that action had already been initiated to meet the demand for trained manpower for the petrochemical industry. The government has already decided, he said, to set up a petrochemical institute for training people in various disciplines. The location will be decided shortly.

With the steep increase in demand for plastics, the government has already identified some project to be set up during the eighth plan period. Attention is also being paid to some of the new projects which might be taken up for speedy implementation.

The apex committee envisages demand for petrochemicals to grow from 1.4 million tonnes at the end of sixth plan to three million tonnes at the end of seventh plan; 5.4 million tonnes at the end of eighth plan; and eight million tonnes by ninth plan (2000 AD).

Currently per capita plastics consumption is of the order of 0.67 kg while the world average is 6.6 kg. Even with the apex plan fructifying, the per capita consumption for plastics will move up only to 2.0 kg by 1994-95 and 2.6 kg by 2000 AD — a far cry from world level. An investment of the order of Rs. 26,300 crores to create sufficient capacities commensurate with demand has been estimated.

The government has identified major complexes for implementation at a total cost of Rs. 8933 crores with resources both from the state and private sectors.

Mr. Khan said that the development of these industries will help the country in increasing foreign exchange earnings. There is enormous global demand for chemicals, petro-

Assocham hails new locational policy

The Government's decision to relax locational restrictions for MRTP and FERA companies with respect to their investment in delicensed industries enabling such companies to put up industrial units 30 to 50 km away from the outer limit of city depending on its population against the earlier limit of 100 km. has come as a welcome offer to the industry.

Welcoming the decision, the Associated Chambers of Commerce and Industry of India (Assocham) has stated that the earlier distinction between one set of companies and another had no real meaning because locational consideration should be dictated by the nature of industry and not who sets it up.

The chamber is of the opinion that since MRTP and FERA companies have better resources at their command, and possess technical expertise and marketing network, the relaxation will give stimulus to industrial activity.

According to the chamber, for producing quality goods at competitive rates, it is also necessary to remove other restrictions on MRTP and FERA companies in terms of licensing. For instance, the definition of large houses should be changed. Monopoly should be defined in terms of market share and not in terms of value of assets.

Similarly, FERA has to be modified in a manner that foreign originating companies are allowed to function in conformity with international business expectations and practices. Considering that exports have primacy of place in economic policy presently, the restrictions surrounding FERA companies exporting the products manufactured by third parties need a fresh look.

Meanwhile, the PHD Chamber of Commerce and Industry (PHDCCI) has underlined the need to have a fresh look at the orthodox outlook with regard to MRTP and FERA

chemicals and drugs, India, he said, had succeeded in displacing some well established exporters in the world market. During the current year, he said, exports were expected to go up from Rs. 1,300 to Rs. 1,900 crores.

companies for the kind of industrial scenario that has been projected in the 'development perspective for the year 2000.' So far, the chamber feels, very little has been done to allow growth of large houses and FERA companies who have the capacity and the skill to bring about the necessary technological transformation.

In a note prepared by PHDCCI on industrial growth, it has been stated that one of the most important contributions of the liberalised industrial policy is the emergence of a competitive environment.

In fact, the chamber has stated that increase in the delicensing limit in recent time is expected to usher in an era of severe competition in which the managerial and entrepreneurial judgment of the industry will be put to test.

CUSTOMS DUTY ON ZINC REDUCED

The government has reduced customs duties on specified varieties of zinc, aluminium waste and scrap, and copper scrap.

This reduction has been effected, according to an official release, keeping in view the current international prices of zinc, aluminium and copper.

Basic customs duty (basic plus auxiliary) on unwrought zinc has been reduced from 85 per cent ad valorem to 50 per cent ad valorem.

The customs duty (basic plus auxiliary) on aluminium waste and scrap has also been brought down from 95 per cent ad valorem to 35 per cent ad valorem.

Customs duty (basic plus auxiliary) on copper scrap imported for the manufacture of copper oxychloride (a fungicide) has also been reduced from 95 per cent ad valorem to 70 per cent ad valorem.

Flower scent extraction plant budding

The Rs. 1.5-crore project for the extraction of floral concentrates that has been hanging fire since 1985 is expected to receive clearance from the Tamil Nadu Government shortly, says a report appearing in the Financial Express.

The protracted birth pangs of the 100 per cent export-oriented unit, to be located near Tenkasi in Tirunelveli district were in part due to the tight finances of the State Government. The project, promoted by the Tamil Nadu Agro Industries Corporation, had received the okay from the Union Government earlier. Its revival now owes a great deal to the Centre's renewed emphasis on promoting agro-based industries.

The project was conceived with an eye on the lucrative international market. Jasmine concentrate as the concentrate is referred to offers the best potential for exports. Egypt holds sway in the jasmine concentrate market for several years, cornering as much as 80 per cent of the world market in 1982. With an estimated world annual production of jasmine concentrate at 15 tonnes, this no

doubt, constitutes a pretty large chunk of the cake.

In Egypt and Morocco, extraction of concentrate is carried out under French supervision but because of uncertain labour supply and rising costs in those countries, the French are looking elsewhere for production centres.

Indian jasmine first entered the world market in 1977. The trade is entirely in private hands. Production of jasmine concentrate in India is no more than one tonne a year. A few producers (there are a couple of them in Tamil Nadu) it is understood, often have marketing problems as the concentrate is an exclusive product which demands strict quality entirely controlled by the buyers who are mostly French.

For this project, the TN Agro Industries had proposed floating a separate company styled TAI Aromatics Ltd. with an authorised capital of Rs. 50 lakhs. The original cost of the project was Rs. 125 lakhs. As these figures pertain to three years ago, allowances will now have to be made for cost escalations.

A French firm, Robertett, through their wholly-owned subsidiary, Ca-

vallierfreres and Kato Aromatics of Egypt, who between themselves control about 60 per cent of the international jasmine trade proposed subscribing to 51 per cent equity of the venture. Robertett is a well-established company in the perfumery business with subsidiary companies in the US, Argentina, Brazil, Mexico, Japan and Switzerland and with a stake in Kato Aromatics too. White TN Agro Industries would contribute 39 per cent of the equity, a Bombay-based firm, Deepa Aromatics Pvt. Ltd. was to contribute 10 per cent of the equity.

The technology for the project was to have been supplied by the French-Egypt combine with an assured buyback arrangement for a period of five years initially. From the third year of the project going on stream exports were to be to the tune of Rs. 2 crores a year.

But the picture has altered considerably since the project was first proposed. The French firm, perhaps irked by the prolonged delays, is no longer interested in contributing to the equity and is only prepared to provide the technology and ensure a buyback arrangement. Deepa Aromatics, which was to have had a 10 per cent stake in the company, is no longer in the picture and TN Agro Industries will have to go it alone. Indications are that it will.

The Tenkasi area was chosen by the French experts after scouting around the State. The region was picked because of its red, loamy soil with a good draining facility thought ideal for flower cultivation.

As only one variety of jasmine is required for extraction — jasmine grandiflorum — extensive propagation activities were undertaken under a phased programme to distribute the cuttings developed at the Tamil Nadu Agricultural University, Coimbatore. Moreover, most chambers have also been put up at the Government orchard at Courtallam to develop these cuttings which will be sold at nominal rates to farmers in and around the factory location, ensuring a captive plantation for the unit, which has an operating capacity to process five tonnes of jasmine a day. It was proposed to process 750 tonnes of jasmine a year and produce around 1.8 tonne of concentrate.

A tonne of jasmine processed will yield around 2.3 kg of jasmine concentrate and the price per kg of concentrate can be as high as Rs. 10,000

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Plasma metallurgy developed at RRL

Many processes in chemical and metallurgical factories could be faster, cheaper, and pollution free if they use plasma, scientists say. Plasma, is a very hot ionised gas having approximately equal numbers of positive ions, free electrons, neutral atoms and molecules.

Researchers at the Regional Research Laboratory (RRL) Bhubaneswar have for the first time in India, successfully used plasma in metallurgical processes.

They have developed a plasma reactor suitable for melting and smelting of a variety of ores and minerals.

Scientists say the use of plasma has been found to be very economical in minimising pollution during production of ferro alloys like ferro-tungsten from wolframite and ferro-chrome from chromite ore fines.

"Plasma has been successfully applied in industries for welding, cutting and spray coating, and we thought it could be tried for smelting," says RRL Assistant Director, Mr. B. C. Mohanty, who heads the special materials division.

Plasma is produced when a gas is heated to high temperature, splitting its electrons from their atoms, thereby forming a mixture of positive ions and electrons.

The most convenient way to produce plasma is to pass gas through an electric arc.

In the 35 kva reactor developed by RRL, the plasma forming gas is introduced into the 'arc zone' through the axial hole provided in the electrodes.

Its properties can be varied depending on the choice of plasma forming gas, its flow rate and voltage across the electrodes, researchers say.

The RRL reactor, which is a substitute for electric arc furnace has been utilised for smelting of ores on the two to three kg scale.

When heated to 20,000 degree celsius, plasma is useful for chemical and metallurgical applications.

Mr. Mohanty says plasma reaches a temperature of 10,000 degree celsius when it has two per cent ionised gas.

In a fully ionised state — a condition prevailing in fusion reaction — plasma reaches a temperature of 100 million degree celsius.

At first plasma technology was applied to astrophysics, space pro-

pulsion and power generation and later extended to other areas.

Realising the importance of plasma in metallurgy and material science, the Council of Scientific and Industrial Research (CSIR) has identified it as a national thrust area project.

RRL has already worked out a new programme for research in plasma in collaboration with the Bhabha Atomic Research Centre (BARC), Bombay.

TIFAC TOLD TO COLLECT DATA ON 100 SUBJECTS

As a prelude to setting up a comprehensive database facility at the national level, the newly formed Technology Information Forecasting and Assessment Council (TIFAC) has been asked to prepare data on 100 different subjects.

The subjects have been chosen covering a range of economic activity in the country. The Council for Scientific and Industrial Research (CSIR), one of the major participants in the TIFAC, had been instrumental in selecting these subjects.

The range of subjects cover elec-

tronics including microelectronics, lasers, biochemistry, pesticides, drugs etc. Due weightage has been given to collection of data on all the on-going renewable energy programmes in the country. The 100 subjects would constitute the first phase of the working of TIFAC, and ultimately the council would aim at creating a national data base, it is stated.

The work of TIFAC is expected to be supplemented for parallel efforts by the newly set up organisations such as the Technology Development and Information Company (TDICI), the Credit Rating and Information Services of India Ltd. (CRISIL) and National Micro-electronics Council (NMC).

At present, TDICI, CRISIL and NMC are collecting industrywise specific data for their own requirements which could easily be transferred to the national data base. Besides these institutions, National Aeronautical Laboratories (NAL), Defence Research and Development Organisation (DRDO) and Oil and Natural Gas Commission (ONGC), which have tie up with foreign organisations for collecting latest information, could also provide the inputs for the database, these sources said.

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Industries categorised for pollution control

Industries have been classified into 'red', 'orange' and 'green' categories for inspection and enforcement of pollution control laws.

Seventy one industries have been placed in the 'red' category and 51 in the 'orange' and 'green' categories under new guidelines issued by the Ministry of Environment and Forests.

The guidelines follow representation by small-scale units to the Government that the number of inspections under various pollution control statutes should be reduced to ensure least disturbance to the industry's working.

The guidelines have been issued for reduction in the frequency of visits by Government officials keeping in view the requirement of pollution control on the one hand and least disturbance to the working of industries on the other by keeping inspections to the minimum.

Industries have been classified as large, medium and small-scale based on the investment criteria laid down by the Government which at present is: small-scale up to Rs. 35 lakhs, medium-scale Rs. 35 lakhs to Rs. 5 crores and large scale is above Rs. 5 crores.

Under the guidelines, the frequency of visits by the Pollution Control Board officials and other inspectorate staff would be determined depending upon the category to which an industry is classified.

All large-scale industries have been placed under category 'red' and frequency of their inspection will range from once a month to once in six months.

For medium industries under 'red' category, frequency of inspection will be once in three months. For those under category 'orange', inspections would be once a year and for those under 'green' once in two years.

For small industries falling within the 'red' category frequency of visit by pollution control officials will be once in six months, for those under 'orange' once a year and for those under 'green' once in two years.

When an industry seeks consent from the Pollution Control Board as required under the law, the Board will decide as to which category it belongs depending on the pollution causing potential.

This categorisation will be done

in all cases when the question of inspection comes up.

Among the industries classified as 'red' include ceramics, rubber, large

flour mills, oil extraction, steam generating plants, machine tools, industrial gases, petroleum, drug, refrigeration units, photographic products, metal extraction, cement plants, synthetic fibres, sugar mills, caustic soda and explosives.

Air pollution alarming : WHO

Two-thirds of the world's 1.8 billion city-dwellers breathe air that contains disturbingly high levels of sulphur dioxide and dust, says the World Health Organisation (WHO).

This worrisome statement is just one of scores of significant conclusions in a 100-page scientific report on air pollution monitoring in major cities of 50 countries.

The study, along with two equally detailed reports on world water pollution and food contamination, was approved recently by health and environmental experts from 12 industrialised and developing countries at a meeting in Geneva held under the auspices of the United Nations Environment Programme (UNEP) and WHO.

The participating countries were Australia, Brazil, Canada, China, Egypt, Ghana, Hungary, India, Japan, the Netherlands, Sudan and the United States.

The report estimates that 625 million people, mostly in developing countries, are exposed to unacceptable levels of sulphur dioxide pollution and another 550 million live in marginal conditions.

The situation is not so good in respect to dust and smoke (Suspended Particulate Matter-SPM). About one billion to 250 million human beings live in unacceptable conditions, and another 200 million have only marginal conditions. So, less than 20 per cent of city-dwellers or around 350 million people, live in air quality conditions that can be considered acceptable.

When air quality levels exceed WHO guidelines for sulphur dioxide and SPM in cities, one may expect increased respiratory problems among adults and children, and more lower-respiratory tract illness, particularly in children.

Although data from developing countries is scanty and patchy, it appears that "in many of them the emissions of all five pollutants studied are increasing."

The 80-page water quality assessment study is based on 344 monitoring sites in 40 countries: 240 rivers, 43 lakes and reservoirs, and 61

groundwaters, supplemented by other national data.

To evaluate water quality, information on more than 50 factors has been collected, including bacteria, nitrates, faecal coliforms, dissolved oxygen and heavy metals.

The report says very severe pathogen pollution, causing infant deaths, occurs in many developing countries, especially when water availability is low. Many stream and rivers in central and tropical South America, the Indian sub-continent and South-east Asia have very high concentrations, judging, for example, from faecal coliforms and nutrient levels.

"Around ten per cent of all rivers may be described as polluted", the report says, adding that the Ganges river is "probably the most polluted river of its size due to high population density along its banks and in the catchment."

FIEO PLEA ON SUPPLY OF RAW MATERIALS

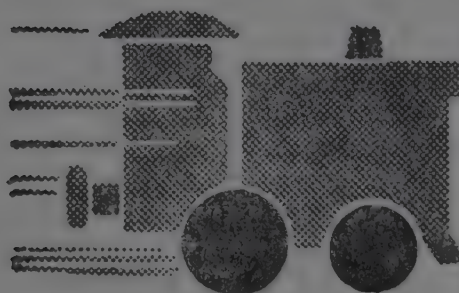
The federation of Indian export organisation (FIEO) has urged the Union government to issue mandatory orders to public sector undertakings for priority supplies of raw materials and intermediates to advance licence and pass book holders at international prices.

In a memorandum to the government, the FIEO president, Mr. Ramu Deora, has stated that this has become imperative because prices of imported supplies, particularly of chemicals, have suddenly gone up rendering India's exports of dyes, chemicals and pharmaceuticals non-competitive.

Taking to newsmen in Delhi recently Mr. Deora said, FIEO has urged the Cabinet secretary, Mr. B. G. Deshmukh, to evolve a new scheme for those export units which are continually exporting more than 25 per cent of their production.

The scheme, on the lines of 100 per cent export-oriented units and free trade zones, should provide a package of incentives to companies exporting between 25 and 60 per cent of their production continuously for the previous three years.

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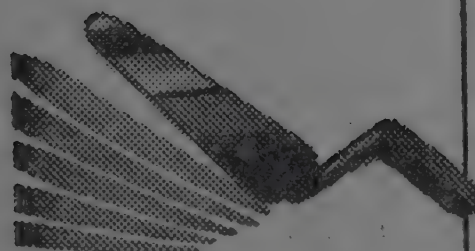


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Heliofast Red BB
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Red Toner BA
Colour-Chem Fast Beta
Blue SPL
Colour-Chem Fast Blue CBR
Colour-Chem Phthalo-
cyanine Green GN/GNX

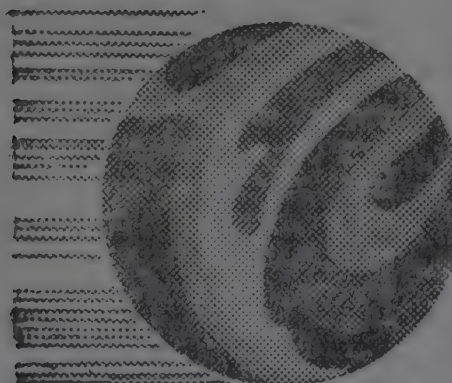


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Hansa Yellow G
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Hansa Red 3B
Permanent Red H2BM
Permanent Red GG

Permanent Red F4RH
Permanent Red Toner
R-142
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Guidelines on delicensing announced

Raw materials allowed to be imported under open general licence (OGL) will not be included while calculating the foreign exchange requirements of project undertakings that seek to make use of the delicensing facilities announced in June this year.

Components import, however, will be included in such calculation, even if they are on OGL.

The exclusion of raw materials and inclusion of components are significant because the delicensing measures had stipulated that the benefits under the new scheme would not be available if the import content exceeds 30 per cent of the project's annual production.

As such the import content of a project's annual production requires to be calculated before the delicensing facility can be extended to a project. It is in this calculation exercise that raw materials would be excluded and components included.

A press note, giving the detailed guidelines for delicensing measures, further states that steel and such other raw materials as may be specified by the Government would also be excluded while calculating the foreign exchange requirement.

It has also clarified that the customs and countervailing duties payable on all imported raw materials and components, as well as excise duty on the manufactured product will be excluded while calculating the ex-factory value of annual production. In other words, the ex-factory value should include no element of customs and excise duties.

The note states that the calculations will be done on an annual basis starting from the very first year of production.

Significantly, the guidelines have stipulated that the import content limit of 30 per cent of annual production will be relevant for the purpose of delicensing only. It would not be applicable to the phased manufacturing programme (PMP). The PMP policy would continue to be governed by its own norms.

The guidelines have referred to the earlier stipulation that any industrial undertaking, which was previously exempted from the relevant provisions of the IDR Act and which is not so exempted now by virtue of the delicensing measures of June should obtain a carry-on-business (c.o.b.) licence.

It is now clarified that if an industrial undertaking already holds a valid registration granted before June 30, 1988 by any of the technical authorities, it need not apply for a c.o.b. licence. The registration will be regarded as valid for carrying on the business in respect of the product, quantity and location mentioned in the registration.

Such validity will be granted to registration of even units which operate in an industry, which is otherwise not eligible for the delicensing facilities. There are 27 broad groups of industries, where procurement of an industrial licence has been made compulsory for all units. But if delicensing facility has been obtained in any of these industries prior to June 30 through registration, the facility would continue to be enjoyed by the unit.

Similarly, the delicensing facility would continue to be enjoyed by the unit, even if its location falls within the specified distances from 21 cities. Normally, units located in such areas would not qualify for the delicensing facility, but an exception would be made for units, which got registered as delicensed prior to June 30.

However, for carrying out a substantial expansion of capacity or for undertaking a new article of manufacture at the same location, the unit would have to apply for a licence under the IDR Act.

The guidelines have stipulated that an industrial undertaking seeking to avail itself of the delicensing benefits should register itself with the specified authority. Directorates of industry in the States and Union Territories are the authority for small-scale and ancillary undertakings, Development Commissioner for Iron and Steel, Calcutta, for iron and steel items, Textile Commissioner, Bombay, for textile items and Secretariat for Industrial Approvals for all other industries and items.

The guidelines refer to the decision that no licences would be required if the investment is less than Rs. 50 crores in a project located in a centrally declared backward area or if the investment is less than Rs. 15 crores in a project located in a non-backward area outside the specified distances from 21 cities.

These distances are 50 km from Calcutta, Bombay, Delhi, Madras, Bangalore, Ahmedabad and Hyderabad, 30 km from Pune and Kanpur and 15 km from Nagpur, Jaipur, Lucknow, Coimbatore, Patna, Surat, Madurai, Indore, Varanasi, Jabalpur, Agra and Vadodara.

It is now clarified that these distances are to be measured from the boundary of the urban area limits and not from the centre of the city. The application form for registration includes a certificate to be given by the applicant to the effect that the location of the industrial undertaking will be outside the prescribed distance limits.

The applicants should ensure that the distance criteria are not violated and they should choose locations which are unambiguously outside the prescribed distance limits.

It is pointed out that the delicensing facility is open to all small-scale and ancillary units, industrial units set up by companies not operating under the MRTP Act or FERA and to those MRTP companies which utilise the facility to produce an item in which they are not dominant under the law. The scheme will now apply even to units established by companies covered by Section 29 of FERA.

The guidelines have clarified that the delicensing facility would be available to the small-scale and ancillary undertakings in their entirety, except in respect of the industries listed in the special list of industries, where licensing has been made compulsory. In fact, even the medium, large, public sector or private sector units would not get the delicensing facility in respect of these 27 industries, regardless of the investment amount or location.

The criteria for including the 27 industries in this special list are: (a) they require special regulation for socio-economic reasons, (b) they are polluting (c) they require control from the ecological safety and hazardous angles, (d) the raw materials required are in short supply and (e) special policies exist for regulating the industry concerned.

Apart from registration, no foreign collaboration, import of capital goods, components, raw materials or designs and drawings, allotment of scarce raw materials, approval of PMP or any other industrial approval will be given to any industrial unit unless it holds a valid licence.

under the IDR Act for items contained in the special list.

Applications for registration would have to be made in the prescribed form in five copies with a fee of Rs. 1,000 per application, and a separate application for registration would have to be made for each article.

The applicants would have to give correct information and if the information provided is found false later, the registration or any other industrial approvals granted would be cancelled. Additional actions may also be taken under the IDR Act. The applicants have been advised to consult the registering authorities in case they need any clarification.

MACHINERY IMPORT BY NRIS EASED

The Government has relaxed the guidelines governing import of capital goods by non-resident Indians (NRI).

According to a Commerce Industry notification, the advertisement guidelines governing import of capital goods will not apply to schemes pertaining to imports by Indians returning from abroad or residing abroad.

Earlier, the exemption from the advertisement procedure covered schemes pertaining to import by Indians returning from abroad for permanent settlement. The notification substitutes this with "Indians returning from residing abroad".

In effect, this means the Indians returning to their homeland and NRIs (who continue to settle abroad but seek to import capital goods into India under the existing NRI schemes) will not be required to go through the advertisement procedures.

The advertisement procedures are meant for such capital goods imports, where the value of the item exceeds Rs. 25 lakhs. In such cases, the intending importer has to advertise his requirement in a specified manner so as to enable interested indigenous manufacturers to respond to his equipment requirement. Even for second hand machinery with a value of over Rs. 10 lakhs, this procedure has to be followed.

In short, the advertisement procedure has been devised in order to give a fair chance to the domestic equipment manufacturers for making a bid for supplying such machinery. The procedure is also aimed at ensuring that before clearing the import, the non-availability of the

machinery in question is established.

Another notification issued by the Commerce Ministry has removed the monetary ceiling of Rs. 1,500 imposed on import of consumable goods pertaining to exhibits required in connection with international or national exhibitions approved by the Trade Fair Authority of India or the Union Government.

Earlier, consumable goods were allowed clearance by customs up to Rs. 1,500 without the requirement of customs clearance permit.

VALUE-ADDED ITEMS: BALCO FARES BETTER

The State-owned Bharat Aluminium Company Ltd. (BALCO) recorded up to 22 per cent growth in the production of value-added products during the first six months of the current year between April and September 1988.

The production of primary metal at the Korba aluminium plant, however, suffered slightly, even though it recorded an eight per cent growth, following the severe power shortages and set backs due to fault in the Madhya Pradesh Electricity

Board System, but for which the output would have been much higher, according to a BALCO press release.

Besides, what is heartening is that despite the severe bottlenecks, the Korba aluminium plant successfully attained upto 97 per cent of the target set out for the first six months period with the total production of primary metal standing at 46,680 tonnes.

In the area of value-added items, the company attained a growth of 22 per cent in the production of rolled products, 20 per cent in the case of rods and 11 per cent in respect of extrusions.

Taking the second quarter performance itself, BALCO produced 23,973 tonnes of saleable aluminium products, achieving 100 per cent target fulfilment as compared to 21,919 tonnes produced during the same period last year, thus recording a nine per cent growth.

In September alone, the company produced 8,040 tonnes of primary metal and 8,031 tonnes of saleable aluminium, representing 101 per cent and 100 per cent fulfilment of the targets respectively.

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China to develop sites for N-waste burial

China has finalised plans for developing several sites for the burial of radioactive waste even as dumping of toxic materials in the Third World appears to be continuing unabated.

Reports in Nuclear Publications say, the Chinese nuclear programme hopes to have two or three such sites for the shallow-land burial of low-level waste (LLW) operating by the turn of the century.

Quoting waste management officials, the reports say that four sites around Daya Bay and Qinshan nuclear plants, now under construction, were being studied.

The officials said that the shallow-land-burial technique, considered obsolete in the West, was "sufficiently safe" for implementation in China.

Export of toxic wastes is on top of the global agenda these days following coming to light of the adverse environmental effect in receiving countries.

The officials justified location of disposal sites near the plants themselves on the ground that transport would be easy.

Stating that intermediate-level wastes would also be placed at the disposal sites, the officials said about 2,000 cubic metres of LLW — generated during reprocessing activities — was already in interim storage.

A cementation facility for solidifying liquid LLW is being constructed at Qinshan.

On high level radioactive waste (HLW), the officials said several hundred cubic metres of HLW, mostly from military activities, was currently stored in tanks.

On management of HLW, they said it would eventually be vitrified and sent to a deep geologic repository.

China's existing reprocessing facilities use the purer technique of plutonium-uranium extraction.

Asked to elaborate on the geologic repository, the officials said "our first focus is on low and intermediate level wastes".

In reply to queries, the officials ruled out salt and clay formations as disposal media.

"For us, salt is a national resource, and some investigations have demonstrated that our clay is too thin. We think granite will be our first choice".

On the proposed site for HLW, they said China had a very wide distribution of areas, and it would be easy to find a site, possibly near one of the plants.

The HLW repository will also accept military waste as the army is not going to have its own repository.

China is studying existing vitrification processes and contacts with some other countries working on disposal programmes were being established.

About 200 staffers at the Beijing institute of nuclear engineering are said to be working on various aspects of radioactive waste disposal.

Experts are of the view that some kind of broad international understanding should be arrived at on managing nuclear waste.

There should be some agreement under the auspices of the International Atomic Energy Agency (IAEA) on both methods of disposal and the norms of handling toxic waste, they opine.

Developed countries have been dumping radioactive waste in some Third World countries in recent times because of the high cost involved in treating it indigenously or exporting it to rich countries where laws are very strict in this regard.

According to one estimate more than 100 shipments of toxic wastes have been sent to Third World countries during the past two years itself.

The countries reportedly include Argentina, Senegal, Zimbabwe, Mexico and Brazil. Dumping of toxic ash from Philadelphia in the US in a Guinean Island also created a raging controversy.

HEAVY WATER LEAK SHUTS MAPS UNIT

The second unit of the Madras Atomic Power Station (MAPS-2), which has been in commercial operation since March 1986, has been shut down for investigation into a heavy water leak in the calandria vault.

An official statement said the source of the leak is located in an inaccessible and high radiation field area requiring special tools for detection and corrective action.

Results of the tests carried out so far indicate the possibility of a leak from the calandria. More detailed

analysis using eddy-current, acoustic emission and vibration tests is presently in progress to pinpoint the exact leak spot.

After this it will be necessary to stop the leak so that the unit restarts as early as possible. The exact time required for the rectification can be determined after the leak spot is identified, the statement said.

The present heavy water leak is entirely contained within the calandria vault of the reactor building and does not pose any radiation hazard either to the personnel or to the public, the statement added.

The statement further stated that the MAPS unit 1 is steadily operating at about 225 MWe and the performance has been excellent for the past six months with the monthly capacity usage exceeding 80 per cent.

NEW REACTOR

A chemical reactor for continuous conversion of uranium from irradiated nuclear fuel has been developed by the Bhabha Atomic Research Centre (BARC).

According to its latest newsletter, a pilot plant reactor of 222 litre active volume, capable of processing 10 to 12 kg of uranium an hour has been built.

The reactor, developed by BARC's process engineering and systems divisions, is capable of handling uranyl nitrate over a wide range of acidity, uranium content and feed flow rates without difficulty.

BIOMASS-BASED PPOWER PLANT SET UP AT ANDAMANS

A 3.5 kw biomass-based Sterling engine demonstration power plant has been set up at Port Blair as part of efforts to meet the energy requirements of people living in the Andaman island.

A team of experts led by Mr. Maheshwar Dayal, secretary, Department of Non-conventional Energy Sources, (DNES) which visited the Andaman and Nicobar islands recently, has drawn up an action plan to be undertaken in the field of non-conventional energy sources for the islands in the remaining two years of the Seventh Plan as well as medium term and perspective plans upto the turn of the century.

NEWS REPORTS

Another oil crisis round the corner

The current instability in world oil markets may degenerate into a repeat of the 1986 oil crisis unless oil producing countries take steps to ensure that a similar price plunge does not recur.

This note of caution was made by Mr. Abdelhadi Kandil, the Egyptian Minister of Petroleum and Mineral Resources, while delivering a keynote address at a session of the Asia-Pacific Petroleum Conference on the second day.

Mr. Kandil said stockpiling, poor policy co-ordination, lack of discipline in enforcing quotas and the tendency to ignore persistently the "well-defined yardstick" of an official price were main reasons for the instability.

The same warning was given by the OPEC official (Organisation of Petroleum Exporting Countries) Mr. Rilwanu Lukman when he addressed a press conference later.

He described the current situation "very serious" though slightly different from the situation in 1986 when prices fell to about US-nine per barrel after Saudi Arabia and other OPEC countries greatly increased their output.

Mr. Lukman said now the industry has the benefit of that experience behind them and several non-OPEC members have shown willingness to restrain

their own production levels — a condition not present in 1986.

At the conference non-OPEC oil producers, Egypt and Oman, both indicated that they were willing to curtail their own output if this could help OPEC bolster sagging prices.

On the contrary, the Malaysia Government-owned Petronas President Zainul Abidin spoke of steps being taken by the country for stepping up oil production.

He said Seligi, the largest oil field in Malaysia with estimated proven reserves of about 440 million barrels, was expected to be on stream in December next, while Duland with estimated proven reserves of 170 million barrels, was being jointly developed by Petronas and Esso on a unitisation arrangement.

Another major project being undertaken, Mr. Zainul said was the peninsular gas utilisation production which was started in 1982 to exploit the abundant gas reserves as alternative source of energy.

MATSCIENCE GETS COMPUTER FACILITY

The Institute of Mathematical Sciences in Madras has acquired a computer to expand its research facility.

Education Secretary H.B.N. Shetty inaugurated the facility recently and promised the State Government's backing in all developmental efforts. The Centre would also be approached for a larger quantum of funds for Matscience he said.

Institute Patron C. Subramaniam, who unveiled a portrait of Prof. Robert E Marshak, the first visiting Neils Bohr professor at Matscience, called upon researchers not to rush to the press to air their views on the institute's internal affairs.

Director E.C.G. Sudarshan said the institute had about 36 research workers now. Since January 1988, over 30 papers had been sent for publication. One paper by Simon, Sudarshan and Kimble had drawn a special mention in Nature — a reputed scientific journal.

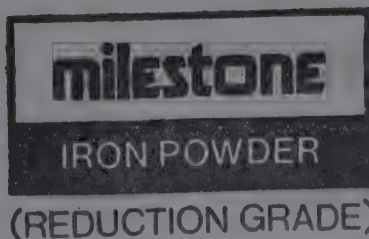
Work on the Matscience guest house project was started recently, and the library plan was underway. Offering felicitations, Indian Institute of Technology Prof. H.N. Mahabala said the new computer facility would give a big boost to its theoretical computer science base.

Matscience Founder-Director Alladi Ramakrishnan traced the growth of the institute. Prof. Marshak had come to the institute at a time when it had a poor financial standing.

Indian Institute of Science Prof. N. Mukunda and Matscience Associate Prof. K. Srinivasa Rao offered felicitations.

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Plastic machinery sops hailed

While presenting the Budget the then finance minister, Mr. N. D. Tiwari had withdrawn the concessional rate of duty on three items of machinery, namely, stretch blow moulding machines, multilayer coater/extruding machine and plastic and laminate collapsible tube making machine. The fact is that stretch blow moulding machines and multiwall laminated tube — making machines are yet to be developed indigenously according to Mr. A. B. Goradia, president, All India Plastic Mfr. Association. These two machines, he said, rightly kept under OGL should be given the benefit of concessional duty at 35 per cent.

Multilayer coater/extruding machines are partly developed indigenously. Particularly tandem coating or multilayer coating and co-extrusion film plants or multilayer film extrusion plants upto three film plants or multilayer film extrusion plants upto three layers have been successfully manufactured by indigenous manufacturers. The machines

above three-layers require high technology and expertise in the production of film for food packing.

AIPMA has been urging the government in the ministry of finance by constantly making representations and meeting the government officials to restore the concessional rate of import duty for import of the above said machines since March, 1988. Though belated the government has now acceded to the request of the association and restored the concessional rate of import duty of 35 per cent for import of the above three plastic machines. These machines were, in fact permitted for import at concessional rate of duty as also under OGL.

LPA'S FILM ON TRANSPORTATION OF HAZARDOUS CHEMICALS

Road transportation of hazardous chemicals has caused a large number of accidents involving injury to people and damage to the people as well as the environment. The Government of

Maharashtra has introduced a set of legislation to regulate transport of chemicals and to bring about improvement in safety.

One of the important causes in such mishaps is a lack of education on drivers. There is, therefore, an urgent need to educate the drivers and others concerned with the safe transportation of chemicals as required by law.

Keeping this in view, the Loss Prevention Association of India Ltd. (LPA) a non-profit body has produced a film 'Transit Hazard Averted' in collaboration with the Indian Chemical Manufacturers Association (ICMA) in Hindi, which explains in a simple and vivid manner to the drivers why they should take all the precautions in transportation of chemicals. The film also explains what a driver should do in case of hazardous situation developing. This film is of 28 minutes duration and in colour.

For further details, please contact: Loss Prevention Assn. of India Ltd., Warden House, Sir P. M. Road, Bombay-400 001.

MINERALS FACTORY IN CHIDAMBARANAR DISTRICT PLANNED

Speedy steps had been initiated to set up the 600 mw capacity nuclear fuel station at Kudankulam in Kattambomman district of Tamil Nadu, according to Mr. T. K. Garg, Chairman and Managing Director, Indian Rare Earths Ltd, Bombay.

He said that the project report of the proposed Rs. 20-crore minerals factory at Kuthiramoli near Nazareth in Chidambaranar district would be ready soon.

He said a plant with a capacity to treat 50 tonnes of minerals a day would be set up on an area of 2,000 out of the 5,000 hectares acquired for the factory.

He said the modernisation of the IRE plant at Manavalakurichi taken up at a cost of Rs. 8 crores would be completed by mid-1990.

Mr. Garg said the company had earned foreign exchange worth Rs. 15 crores during 1987-88.

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Bhatnagar prizes announced

Nine scientists and technologists have been selected for the Shanti Swarup Bhatnagar prize for 1987.

The names of the scientists were announced by Dr. A. P. Mitra, director-general of the Council of Scientific and Industrial Research (CSIR) on the occasion of CSIR foundation day.

The prizes, instituted in 1957 in memory of Sir Shanti Swarup Bhatnagar, the first director of the council, carry a cash award of Rs. 50,000 and a citation.

The recipients in the field of physical sciences are Prof Vijay Kumar K. pahi, Tata Institute of Fundamental Research, Bangalore, and Prof Probir Roy, Tata Institute of Fundamental Research, Bombay.

The prize in the category of chemical sciences has been awarded to Prof Debashish Mukherjee, Indian Association for the Cultivation of Science, Calcutta.

The award for biological sciences is shared by Prof Sudhir Kumar Sopary, Jawaharlal Nehru University, New Delhi, and Prof Avadesha Suroia, Indian Institute of Science, Bangalore.

Prof Shrikant Lele of the Banaras Hindu University, Varanasi, has been chosen for the prize in the category of engineering sciences.

The award for mathematical sciences has been jointly awarded to Dr. R. Parimala and Prof Tarlok Nath Shorey, both of the Tata Institute of Fundamental Research, Bombay.

Prof Pramod Sadasheo Moharir of Roorkee University has been chosen for the award in the category of earth sciences.

The Prime Minister, Mr. Rajiv Gandhi, will give away the prizes at a function in New Delhi on October 17.

SCI CONTRACTS FOR 3 TANKERS

The Shipping Corporation of India Ltd. (SCI) has signed a contract with Astilleros Espanaoles, for the construction of three chemical tankers of 30,800 dead-weight tonnes, says a SCI press release. Astilleros Espanaoles are a Government-owned group of shipyards in Spain, owing about 70 per cent of the Spanish shipbuilding capacity.

These vessels are specially designed and constructed to the highest standards of the classification society, Det Norske Veritas. The tankers will have a service speed of 15 knots. The cargo tanks of these vessels will be suitable for the carriage of phosphoric acid and also other chemicals like acetone, diethylene glycol and ethylene carbonate.

India imported large quantities of phosphoric acid. It is estimated that by 1990, the annual import of phosphoric acid would reach the level of 24 lakh tonnes. To cater to this huge import requirements, the country needs shipping tonnage of the order of 3.2 lakh dwt. As against this, Indian fleet now

has only three phosphoric acid carriers of a total dwt of 0.58 lakh. There is thus a large gap between the demand and supply of phosphoric acid carrier tonnage.

As a result, presently, phosphoric acid imports are mostly in foreign vessels. This results in drainage of scarce foreign exchange, which would be reduced to a great extent to the advantage of the country's economy through acquisition of these three vessels, according to the release.

1 GIANT FERTILISER PLANT PLANNED EVERY YEAR

The government is considering commissioning of one giant fertiliser plant every year, in the Eighth Five Year Plan commencing 1990, Mr. R. Prabhu, minister of state for fertilisers discloser in Vrindavan recently.

However, the Cabinet would have to take a formal decision on the setting up these modern and "super" plants and the decision would have to be approved by the Planning Commission as each of them would cost about Rs. 800 crores the minister said.

PARADEEP PHOSPHATES

Paradeep Phosphates, an enterprise of the government of India and Nauru, has achieved a record production of 68,000 tonnes of DAP during August 1988 which is 113 per cent of average monthly production capacity. Further, the company has also made despatches of DAP to the tune of 87,670 tonnes by rail and road to its marketing territory which is also 146 per cent of targetted monthly despatches.

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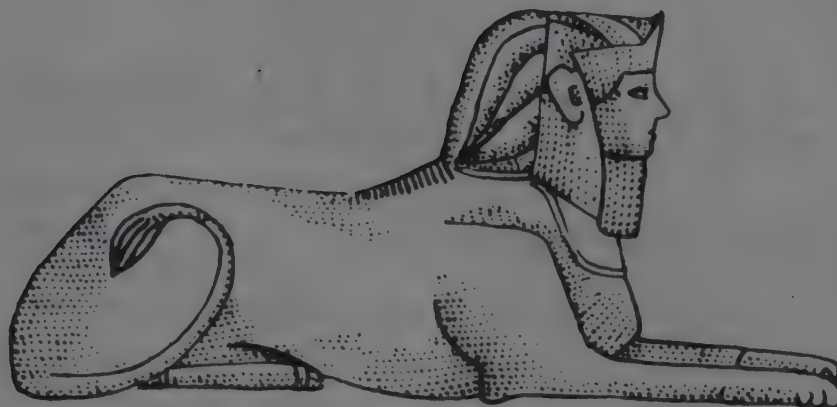
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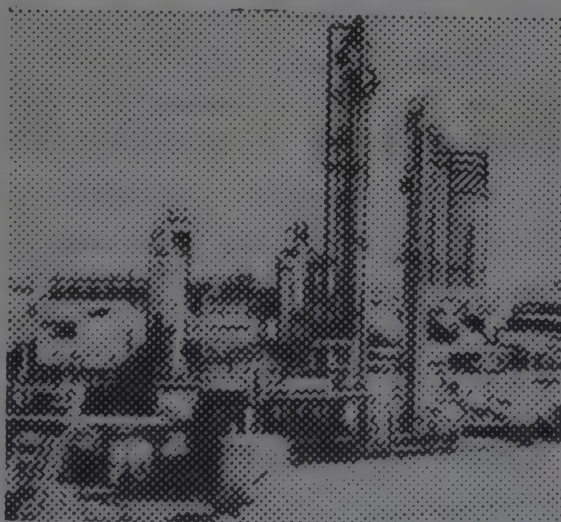
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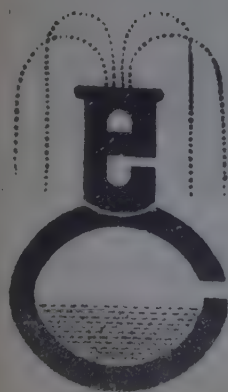
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SPOTLIGHT ON

Biotechnology & Life Sciences (Part 1)

**MONSANTO UNVEILS
GENETICALLY ENGINEERED
SOYA BEAN PLANT**

Monsanto has produced a genetically engineered soya bean plant that is resistant to the company's herbicide 'Roundup'. Tolerance to herbicide has the potential to cut the cost of growing the commercially important crops. The soya plant is transformed using a gene-spliced crown gall bacterium *agrobacterium tumefaciens*.

'Soya bean is a good target for genetic improvement via plant transformation because it would facilitate the rapid development of new varieties with traits such as herbicide or viral resistance as well as seed quality improvement' reports Monsanto plant sciences group leader Dr. Maud Rinchee. However, it will be several years before such value-added soya bean plant are available commercially. (ECN, 6/20/88, p. 24).

**MOTOR FUEL FROM ALGAE
ON THE HORIZON**

Scientists at the Solar Energy Research Institute (SERI), at Golden, Colorado, USA have recently shown that algae can be an economic source of oil and chemicals and could supply over 8% of USA's motor fuel requirement by 2010 AD. The researchers are working on certain algae which produce a large amount of lipids.

Lipids are molecules made up of chains of hydrocarbons. These can be extracted and used to make diesel oil or petrol. The algae under study are *Chaetoceros* and *Nannochloris* and the green algae *Monoraphidium*.

Given the right conditions they multiply so rapidly that a pond 20 metres in diameter can produce over 4 tonnes of algae per year.

The researchers at SERI report that the algae can thrive in water that is twice as salty as sea water. But the ponds should be sited at locations having sunshine for at least 6 months of the year. These conditions can be met in the tropical countries like India and Middle East. These are often areas, where water is in short supply. But if local water is salty for watering fields, algae ponds could come into their own.

To get the algae started, a nitrogen compound urea, is added to the water along with a pinch of phosphate and other trace elements if these are missing from the local supply. The algae then grow rapidly consuming carbon dioxide from the air. The researchers have found that if extra carbon dioxide is bubbled through the pond, then the algae can double their numbers up to 5-times within a day. This makes them several times more productive at generating biomass than a tropical rain forest. Water gas from a coal or oil field power station could provide the carbon dioxide.

The secret of the process is in inducing the algae to use their energy to make lipids. This is done by controlling the supply of nitrogen and silicon during the process. In the laboratory the algae can convert over two-thirds of their mass to lipids. It is also possible under these conditions to harvest 50 gms. of algae per sq. meter of pond per day.

Given this, and an 80% conversion of lipids to diesel oil, a pond 20

meters in diameter could produce over 3000 litres of fuel per year at a cost of only 25 pence per litre. The lipids from the algae can be turned either into diesel or petrol. Heating with a mixture of hydrochloric acid and methanol produces diesel, by a chemical reaction called transesterification.

This is a two-step process in which the lipids first break down to release fatty acids, which then react with the methanol to form methyl esters, that can be used as fuel. Such molecules however, still contains the oxygen atoms, which must be got rid off, if the oil is to be used for petrol. The SERI team has shown that this can be done by passing the oil over a zeolite catalyst ZSM-5.

The researchers are now focussing their attention on molecular biology as a way of improving the algae to get them to produce more lipids. At the same, other groups will be looking at pond design and yet others at the non-lipid part of the algae as a source of chemicals. Carotenoids are one such algae by-product that could make certain vitamins or be used as a natural food colouring. (New Sci., 6/2/88, p. 35).

**ANDEAN TUBER SAVED
FOR POSTERITY BY
GERMPLASM BANK**

Before the Spanish arrival in Peru, the Incas were cultivating 80 species of food crops, most of which were unknown to Spanish conquerors. One of them, the potato soared to international stardom as the best gift of the Incas to world agriculture.

The crops of the Andes have been neglected by science. Although

farmers have for centuries selected seeds and tubers from their favourite plants, breeding could greatly improve productivity. For example, Andean husbandry producers has a yield of 5 tonnes of oca per hectare, whereas improved varieties of oca provide New Zealand farmers with more than 20 tonnes per hectare.

In 1985, Peru's National Programme on Andean Crops was founded enabling Peruvian scientists to begin to study the requirement and characteristics of the native crops.

With the financial help of USAID and UN's International Board for Plant Genetic Resources and Lima's International Potato Centre, researcher Polands Estrada set up in 1983 an in-vitro germplasm store for the three main Andean tubers -- oca, ollucu and mashna -- at San Marcos University in Lima. Estrada, head of the university's laboratory of genetic resources and biotechnology, asked in the nick of time to save the disappearing species of tubers.

Estrada has 300 accessions (distant clones) of the one species of olluca that forms tubers. He has also stored 340 accessions of oca and 110 of mashna. The tiny plantlets are grown in small conical flasks in a refrigerated room with controlled lighting. Estrada, who worked on tissue culture of potatoes at the International Potato Centre, has used similar techniques to retard the growth of the stored plantlets of other tubers. Mannitol, at a concentration of 4% is the growth medium, stops ollucu and meshna plantlets taking up nutrients as fast as they would under normal conditions. This osmotic-stress technique, however, does not work for oca. Estrada retards the growth of the oca plantlets by adding the plant dormancy hormone, abscisic acid, to the growth medium. He is now carrying

out tests to find out whether such measures induce genetic variability in the crops.

Alan Brunt, a researcher at the Institute of Horticulture at Littlechampton (UK) has noted that the many viruses are associated with Andean tubers. These viruses reduce the productivity of the tubers. Brunt cleans the tubers by cutting the meristem tissue -- the young, rapidly dividing cells at the apex of the stem -- and growing a new plantlet. The meristematic tissue from the new plantlet is again cut and grown up. Brunt repeats the process until there are no more viruses present in the tissue.

The virus-free material can then be safely exported to countries and grown in fields without danger of introducing new and potentially lethal viruses to existing crops. The Andean tubers and root crops could prove valuable in mountainous developing countries such as Ethiopia, Bhutan, Nepal and Papua New Guinea. (*New Sci.*, 6/2/88, p. 57).

A NEW TECHNIQUE TO DOUBLE MILK PRODUCTION IN INDIA

A team of Indian dairy scientists has successfully field tested a technique that make non lactating cattle give milk as a means of quickly boosting milk production in the country. The technique called 'Induced Lactation' is intended for use in the country's more than 40 million cows and female buffaloes who, though generally healthy and within lactating age, do not give milk.

The new technique involves giving cows a special injection made up of a combination of two hormones, both of which act on the physiology of the cattle and induce lactation. The cows begin to lactate within two weeks of a 7-day course of the injections and the milk flow continues for

the entire duration of the normal lactation period.

The researchers report that the new hormonal technique would help nearly double the country's milk production from the current 45 million tonnes to 88 million tonnes in just two years. But this is doubtful unless our bureaucracy leans to apply this techniques on a mass scale.

AN UPDATE ON MICROBIOLOGY APPLICATIONS IN CHEMICAL PROCESSING

Microbiology applications in chemical processing could yield revenues in excess of \$100 billion by the year 2000 AD, when the \$40 billion presently spent on traditional fermented products are added to the global sales of modern biotech products realized through advances in biocatalysis and genetic and protein engineering. In a report from Heroin International, technical advances and commercial prospects for a wide range of biotech industries and products are studied, including single-cell protein, commodity and fine chemicals, prevention of biodeterioration, metal accumulation, oil recovery, waste treatment and pollution control and fermented foods and beverages. (*Chem. Eng. Prog.*, 7/1988, p. 11).

A NEW BACTERIA CAUSING FOOD POISONING IDENTIFIED

A new food-borne bacteria called *Listeria* has come into limelight in USA and Western Europe and has led to 'Listeria hysteria' among food producers, legislators and journalists. The organism identified recently is *Listeria monocytogenes*.

Listeria is a genus of rod-shaped gram positive non sporeforming bacterium. *L. monocytogenes* can cause diseases in people. Outbreaks of food-borne listeriosis can

cause diseases in people. Most outbreaks of food poisoning by this organism identified have mostly been associated with *L. monocytogenes* type 4b. Other species are rarely harmful to humans.

L. monocytogenes is widely distributed in nature and has been found in soil, sewage, rivers, vegetable and animal tissues and food manufacturing and kitchen premises. Its entry into the food chain via raw milk, meat and vegetables is inevitable. It can grow at an unusually wide range of temperatures, from about zero to 45°C. Growth is slow upto 4°C but between 5 and 10°C -- the temperature of most refrigerators -- the bacteria can multiply to 1 million cells per ml. in a few days in some foods. It can also tolerate high concentrations of salt. Refrigerated soft cheeses therefore provide conditions in which *Listeria* can grow, but which inhibit other microorganisms; the cheese is a selective medium. Preserved meats may be also in a similar category. Prepacked salads are currently undergoing intensive tests as they have been also shown to be a source of *Listeria*.

In people, the effects of *L. monocytogenes* range from a mild flu-like malaise to meningitis and abortion, and include septicaemia, pneumonia, skin lesions and mental retardation in children. Most deaths are attributed to meningitis and fatalities are attributed to suppressed immune system.

Confusion over *Listeria* is still widespread. The WHO and the Department of Health of UK recommend that manufacturers of sample food for the bacterium, but these bodies do not suggest any 'safe' levels for the bacterium. The FDA in USA now has agreement with France for certification of imported cheese for the absence of *Listeria*.

Listeria may have been transmitted in foods for years but its importance in food hygiene has only recently become clear. Its control however may prove difficult in spite of research as has been shown by another group of organism, the *Salmonellae*. (New Sci., 7/9/88, p. 67-70).

AN INTERNATIONAL FOOD BIOTECHNOLOGY COUNCIL INAUGURATED IN USA

A new International Food Biotechnology Council (IFBC) has been formed and incorporated, under the District of Columbia laws for the purpose of identifying and developing guidelines and criteria to assure the safety of foods, food ingredients and food processes for the food biotechnology industry. This cooperative programme in USA brings together for the first time major food processors and companies using biotechnology to produce food and ingredients. Twenty-five companies are presently members. Companies using biotechnology, as well as suppliers and processors in the food biotechnology industry are eligible for membership in the organisation.

Under the direction of IFBC, the International Life Science Institute will be coordinating the scientific efforts of the Council, while the Industrial Biotechnology Association (IBA) will coordinate its legal/regulatory and communications efforts. (Food Technol., 5/1988, p. 60).

F&C & NRCC SIGN AGREEMENT TO DEVELOP NATURAL FLAVOURS & AROMATIC CHEMICALS

F & C International Inc. and the National Research Council of Canada have signed an agreement to develop biotech-derived natural flavours and aromatic chemicals for use in the food industry.

The joint programme will include traditional fermentation approaches and enzymatic conversion of natural substances. These natural flavours and chemicals will be manufactured in Canada to produce biotechnologically derived flavour ingredients.

DISCOVERY OF A NEW SPECIES OF LEMURS

Lemurs of a new species were first observed in 1985 by Bernard Meier and Yves Rumpler, on the Hanomafana region of Madagascar. Last April it was confirmed that they belong to a new species *Hapalemur aureus*. Since their discovery, these monkeys have been investigated by a team supported by the World Wildlife Fund and Duke University in North Carolina. The team captured two specimens. Their chromosome analysis confirmed that the animals are members of a new species.

H. aureus weights about 2 kilograms and is monogamous, each couple living in a territory of 15-20 hectares of forest. The offspring are born in December and live with the parents for two years before leaving to begin an independent existence. Adult monkeys live off freshly-grown leaves. Because these lemurs are so rare -- only 500 individuals of *H. aureus* are believed to exist -- the Madagascar authorities plan to twin this area of forest into a wildlife reserve. (Nature, 5/19/88, p. 206).

A PROPRIETARY OXYRASE ENZYME SYSTEM FOR PRODUCING ANAEROBIC ENVIRONMENT

The Oxyrase System from Oxyrase Inc., is a biocatalyst for the removal of a dissolved oxygen for the creation of anaerobic environments. Oxyrase is specific for dissolved oxygen and does not exhibit the side reactions of other non-specific chemical reducing agents.

according to the company. The company reports that as little as 1-2 ml. of Oxyrase can prepare media for the cultivation of anaerobic microorganisms at a cost of as low as \$3 per litre. Oxyrase is available at 30 units per ml. in 30 ml. and 100 ml. quantities for \$108 and \$300 respectively. (*Nature*, 8/4/88, p. 455-86).

BIOTECH DERIVED SHEEP DIET MOOTED TO IMPROVE YIELDS OF WOOL

Australian wool breeders are looking to a 5% increase in the wool clip as a result of research on the eating habits of Australian sheep. This is largely based on the fact that the sheep's diet is mainly based on sulfur-rich amino acids extracted from grass. In laboratory tests it was found that a boost of up to 30% in wool yield could be achieved by providing suitable foods.

Now the objective is to obtain, an improvement naturally by genetically altering the food being eaten by the sheep. The plant lucerne has already been modified by a gene obtained from a pea seed and then reconstructed so that the lucerne is produced the requisite protein. Work is now pointing towards modification of subterranean clover which is more widely grown in Australia. (*Textile*

Horizons, 4/1988, p. 9).

MEDICAL RESEARCH COUNCILS OF EUROPE DESIGN CODE FOR GENE THERAPY

The treatment of some hereditary diseases by gene therapy is likely to be clinically justified in the near future. Therefore, recently the European medical councils has published guidelines for research into the genetic manipulation of humans. The research councils approve the motion of inserting genes into certain body cells, such as bone marrow cells in an attempt to cure genetic diseases, such as thalassemia. Humans with this severe anaemia have inherited defective genes from both parents.

Such a treatment -- yet to be successfully attempted in humans -- is known as 'somatic gene therapy'. Genetic changes in the cells of a particular tissue would not be passed on to children. The guidelines say that 'germline therapy' -- the insertion of foreign genes into a fertilised egg to create heritable changes -- is 'not acceptable'. Few researchers would disagree, if only because germline gene therapy has little chance of success. Experiments with animal embryos, where researchers inject foreign genes to

create 'transgenic' animals, usually fail. The embryos die or do not take the foreign genes. An easier approach in humans would be to screen embryos for a defective gene, then doctors could transfer only normal embryos into a woman's uterus. Embryologists and molecular geneticists are now joining forces to perfect such 'pre-implantation diagnosis'.

The European research councils also stress the issue of the safety of gene therapy. Most researchers use modified retroviruses to carry foreign genes into cells, but this approach has problems. As it integrates into the genetic material of human cells, the virus can cause mutations which might lead to cancer. There is also a small chance that the retrovirus carrier or viral vector, might combine with a contaminating virus to spread to other tissues or even to other people. 'Much further work is required in the development of safe species -- specific and tissue-specific retrovirus vectors' the guidelines say. To regulate such research, say the guidelines, 'an expert national body' and local ethical committees should approve proposals for therapy. A 'central body' should also assess the outcome of early trials of human gene therapy. (*New Sci.*, 6/9/88, p. 37).

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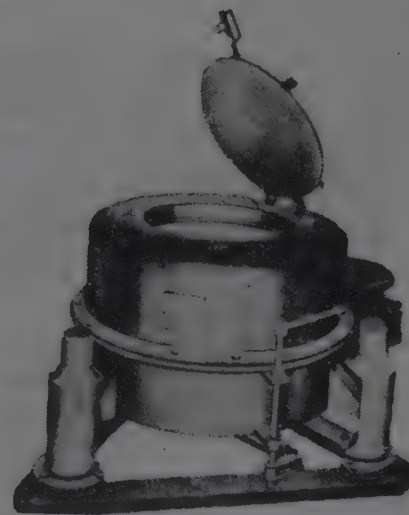
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Food & Pharmaceutical Technology in perspective

A SPECIAL GENETICALLY SELECTED YEAST PRODUCT DEVELOPED TO PRODUCE NATURAL COLORATION IN FISH

Igene Biotechnology Inc. of Columbia, Maryland (a manufacturer of speciality biochemicals for food, flavour and agrochemical industries) and Lefersa Alimentos, S-A, a major producer of farmed salmon and the largest manufacturer of yeast products in Chile, have formed a joint venture to produce and market Astaxin TM, Igene's new all natural dietary yeast supplement that produces normal flesh coloration in farm grown salmon and trout. It provides nutritional supplement as well as astaxanthin pigment. It is a cost-effective product for supplementing the diet of farmed salmon and trout. The coloration is almost identical to the pigmentation found in salmon and trout produced in the wild, which makes the farmed fish more attractive to the consumer.

Astaxin has been tested extensively in Europe and USA. Final testing for the safety and efficacy of the product is under way at the Food Research Institute of the University of Wisconsin, the Tunison Laboratories of Cornell University and the Rangen Aquaculture Research Centre, Hagerman, Idaho. Patent applications are pending in USA and other countries.

Under the terms of the agreement initial supplies of the new yeast product, which is genetically selected but does not involve recombinant-DNA will be produced by Laferia in Santiago, Chile. It will be marketed worldwide by Lafergen, a Bermuda-

based joint venture of Igene and Laferia

The companies (Igene and Laferia) foresee a \$75 million to \$100 million a year worldwide market for Astaxin. It will be available in commercial tonnage by the end of 1988. Total worldwide production of farmed salmon is estimated to have grown from about 10,000 tonnes in 1980 to more than 70,000 tonnes in 1987. By 1990, total worldwide production is expected to exceed 200,000 tonnes, excluding the USA, Japan and others, which is one-third of the entire world catch. Both salmon farming and trout aquaculture are growth food industries, as the consumption of fish continues to accelerate. (*Food Technol.*, 5/1988, p. 60).

PAPAYA IN INDIA -- A MONOGRAPH FROM CFTRI

A 44-page monograph on papaya has been recently published by CFTRI (Mysore). It provides a wealth of information on specific cultural features, varietal characteristics glimpses of fruit chemistry, manufacture and specifications of papain, recovery of pectin and a host of new processed product possibilities.

Modular prospect details have been provided for latex production, manifestation of tutti-frutti and fruit bars. Some essential information has been included on suppliers of equipment and also papain.

Copies are available from the Central Food & Technological Research Institute at Rs. 20.00 (postage extra). Please write to: FOSTIS, CFTRI, Mysore-570 013.

A NEW FAT SUBSTITUTE

Arco Chemical Co. (Newtown Square, Paine, USA) has applied for a European patent covering esterified propoxylated glycerol (EPG) in both liquid and solid versions for use as a non-caloric fat substitute for food products.

EPC manufactured by Arco Chemical using propylene oxide as a raw material may be substituted for conventional oils in food products, such as salad dressings, baked goods, spreads and ice-creams. Although, further research will be needed to generate sufficient data for food additive approval, preliminary studies indicate that EPG is safe, non-caloric and effective as an oil and fat substitute. (*Food Technol.*, 5/1988, p. 61-62).

FOCUS ON ISRAEL'S FOOD PROCESSING INDUSTRY

The Seventh Israel Food Week held in February 1988, gave a good picture of the progress of food industry in Israel. Compared to India, Israel is a small country, but it has made enviable progress in the development of food and agriculture in spite of limited fertile length and arid environment with scarcity of water.

Israel exported more than \$1 billion worth of food products in 1987. Of this agricultural produce accounted for \$600 million and processed foods \$425 million. Expansion and investment by Israeli food companies explains to some extent the increase in exports in 1987, said to be up by 20% on 1986. In 1986

gross investments in the food industry neared the \$100 million mark. By the first quarter of 1987, \$50 million worth of investment has already been made.

Today food industry employs 48,000 workers in about 1000 different factories. Annual production is \$3.7 billion, of which 10% is exported. The industry processes some 4.5 million tonnes of raw materials, of which about two-thirds derives from local sources and the third from imports.

The wide variety of food products now made in Israel was obvious from Food Week Exhibition. One hundred manufacturers displayed over 1,000 food products. Over 759 foreign buyers and 39 food journalists visited the show.

Citrus fruit products account for over 50% of the export of processed foods, making it the most important sector. Exports of products derived from citrus fruits were over \$220 million in 1987. With a population of only 4.5 million, the home market is limited and only 7 to 8% of citrus products made in Israel are consumed locally.

The UK is the biggest market for juice products. In fact, Israel enjoys a 60% share of the orange products market and virtually all of the grape fruit products sold in the UK come from Israel.

Israel is also famous for its quality vegetables, but it is not only fresh products which is demanded by the home and export markets; frozen vegetables have been gaining more and more importance. Sunfrost, the leading Israeli frozen food producer, whose main range consists of almost every vegetable you could imagine, now has a turnover of over \$50 million. This privately owned Israeli Company produces around

25,000 tonnes/year of frozen foods and is the largest producer in Israel.

The company has long term contracts with growers and an agricultural team to supervise growing. For vegetable freezing there is a large factory in Ashdod. The company enjoys a growth of 25% to 30% each year.

Some of the novel food products developed by Israeli industries were exhibited. Twall, an Israeli company has developed a range of meat substitute based on soya and wheat as convenience foods. The problem with soya has always been its beany taste.

Twall's researchers have developed a patented method of integrating soya and wheat proteins, to achieve a clean taste. Texturisation further helped by imparting a meat-like texture and the addition of egg albumin and vitamins give a nutritional quality close to that of meat.

Another unusual processing method developed in Israel is sterilization before packaging for pimper-nice bread for export. In this processing method, sterilization at 90°C ensures that all the bugs are killed before the bread is vacuum packed for the house and export market. This type of processing guarantees a shelf-life of at least six months, an important factor, considering that it is exported to USA.

Our food processing industry as well as Indian agriculture can learn a lot from Israel, especially in arid zone agriculture and horticulture. India's arid zone has a potential to become a large producer of citrus fruits. This potential can be developed rapidly with Israeli expertise. Unfortunately political restrictions prevents India from taking advantage of Israeli expertise. (*Food Manuf.*, 4/1988, p. 61-69).

MICROENCAPSULATED FISH OIL POWDER DEVELOPED FOR FOOD PROCESSING INDUSTRY

Danochema A/S has developed recently a dry powder, microencapsulated Omega-3-fatty acid product (Dry marine PUFA 18:12). The product has been designed for use in the food processing industry and lends itself to the enrichment of dry products.

Microencapsulation enables concentrates of the oil to be presented as a dry stable powder. The product contains 30% fish oil with a ratio between eicosapentanoic acid (EPA) and decosahexanoic acid (DHA) of 18:12. (*Food Manuf.*, 5/1988, p. 21).

JAPAN FILED OVER 8000 PATENTS FOR FOOD PRODUCTS

The Japanese filed for 8,176 patents for food products in 1986 according to the Japanese Foods Patent Counter. Of these, 1,608 involved microorganisms and enzymes or the compounds produced by them. This explosive growth in patent applications is attributable to a surge in research in biotechnology and greater interest in nutrition and processed foods. (*Food Eng. Int.*, 3/1988, p. 18).

BASF OPENS NEW BIOTECH PLANT FOR PRODUCTION OF VIT B12 & NATURAL FLAVOURS

BASF A.G., West Germany has invested \$25 million into a new biotechnological production facility in Ludwigshafen, West Germany. The plant will make several products, including Vit B12 by a new process.

The plant has ample capacities for the production of natural flavour components which were delivered in a joint programme with Fritsche

Dodge & Olcott, a North American Unit of BASF K+F Corp. (*Food Eng. Intl.*, 4/1988, p. 26).

A CHITOSAN DERIVATIVE DEVELOPED TO EXTEND SHELF LIFE OF FRUITS

A fruit spray based on a chitosan derivative from a polymer chitin (derived from crustacean shells) is reported to extend shelf-life of fruits for up to nine months. The spray called Nutri-Save forms a semi-permeable coating on fruit which allows just the right amount of oxygen to pass through to keep the fruit fresh. The coating effectively puts the fruit to sleep by slowing down its respiratory process. In cold storage the fruit will keep even longer.

Chitin is insoluble in most solvents, so thousands of tonnes of crustacean Shells (containing Chitin) thrown out every year by seafood processing plants have gone into waste dumps or back into the ocean. This has created pollution in many parts of the world. Researchers are keen to utilize this raw material and have developed a derivative chitosan, which is soluble in dilute acids.

Earnest Hayes, a chemist from Acadia University (Wolfville, Nova Scotia) has recently produced a water soluble derivative N, O-carboxymethyl chitosan by adding carboxymethyl groups to the chitosan. After he had produced the water-soluble derivative, Hayes met a Canadian researcher by chance, who had specialised in fruit storage. Chitin derivative are known to kill fungi, so they sprayed the new compound on some strawberries to see if they would keep longer. They found that the coating restricted the flow of oxygen and the metabolite carbon dioxide into and out of fruit.

Fruit is a living tissue and requires

oxygen or it dies, then rots. Sugars in fruit are oxidized by enzymes releasing carbon dioxide and water. The Nutri-Save coating slows down the metabolism of the fruit by restricting the flow of gases. Because the fruit receive less oxygen they use up their reserve of sugar, and so decay more slowly. If the fruit is put in cold storage as well then the shelf life can be almost doubled.

Its inventors report this technique is much cheaper and more efficient than current methods. Storage in a controlled atmosphere can do much the same thing as Nutri-Save, but needs large and sophisticated equipment requiring high capital costs. The store must be kept sealed and the levels of oxygen and carbon dioxide carefully monitored to keep respiration to a minimum. Once the seal is broken all the fruit must sold within two weeks.

Using Nutri-Save, the seal is broken only when the film is washed off. It is biodegradable and be used on many kinds of fruits including apples, peaches and pears. Different fruits vary in the amount of oxygen they need in storage. Nutri-Save can be tailor-made for each type of fruit by varying the concentration of the chitin derivative.

SUNETTE -- A NEW SWEETENER FROM HOECHST - CELANESE APPROVED BY FDA IN USA

A new calorie-free sweetener has been recently approved by FDA in USA. This new sweetener called Sunette (brand name) is a product of Hoechst-Celanese research and is especially suitable for dry foods. The sweetener's generic name is *acesulfame-K*.

Sunette is described as a white odorless crystalline product 200-times sweeter than sugar. It has a clean, quickly perceptible sweet

taste and is excreted unchanged by humans and animals. It does not contribute to the development of dental cavities. No health or safety warning will be needed for products using the sweetener according to the company.

The sweetener offers several advantage to the food industry. The taste remains unchanged or stable in solids and liquids and when exposed to heat. It can be stored as a solid for many years and it dissolves rapidly in liquids.

The product is approved by FDA for dry beverage mixes, table top sweeteners, chewing gum, desserts and puddings. The acceptable daily intake set by FDA is 15 mg per kg. of bodyweight, which is the equivalent of a 60 kg. person (132 lbs) eating 180 grams of sugar daily.

When combined with other sweeteners the sweetener produces a synergistic effect: the blend tastes like sugar and has greater sweetening intensity than individual parts of the blend. As a result, less sweetener can be used.

Because the sweetener is safe sweet and stable, the company will seek approval for use in liquids and baked goods. The FDA approval is pending for use of the sweetener in confectioneries.

A NEW TECHNIQUE FOR BLOCKING OXYGEN FOR FOOD PRESERVATION ON THE HORIZON

The researchers at Aquanautics in an attempt to develop an artificial gill as a means of extracting oxygen from seawater for use in underwater life support systems developed, an organic compound called 'Longlife' with a metal centre. This compound was found to have great value in for food preservation.

When food spoils, oxygen is usually to blame. Oxygen damages food by reacting with unsaturated fats to create hydroperoxides. These oxidised fats can adversely affect colour, flavour, aroma and nutritional value. *Longlife* can capture oxygen during the processing and storage of liquid in solid food.

At present vacuum packing and so-called 'nitrogen sparging' (in which the gas is inserted into food) are two of the most common methods of absorbing oxygen from food. But they are expensive and can alter the aroma and flavour of the product. *Longlife*, in contrast, is less expensive and more flexible. Bound to silicate (sand) and used as a powder, the compound can be added and later removed during the processing of beverages to eliminate oxygen prior to packaging. It can also be sealed in a small membrane pouch and placed inside a food

package. Or, it could be incorporated into bottle caps or polymer packages themselves. It has been shown that *Longlife* can substantially prolong the shelf life of certain food products -- notably citrus juices and confections -- without using additives. (*Newsweek*, 8/1/88, p. 3).

U.S. RESEARCHERS FIND PATHOGEN

US researchers have discovered that the pathogen causing the pneumonia which kills AIDS sufferers may be a fungus. Jeffrey Edman at the University of California at San Francisco and co-workers at other laboratories report that the genetic code for ribosomal RNA of the pathogen *Pneumocystis carinii* is more related to yeast than to protozoan RNA.

"By knowing this, more informed decisions, about the design of drugs

can be taken," says Edman. Presently it is not possible to grow the pathogen *in vitro* but, Edman explains: "We will now be able to isolate and clone those genes that may be potential targets for drugs."

Edman and his co-workers at the Hormone Research Institute, University of California, in collaboration with researchers at the National Jewish Centre for Immunological and Respiratory Medicine, at Denver, Colorado and the National Institutes of Health, plan to look at the human pathogen. "To date our research has focused on the rat pathogen and there is some suggestion there may be differences between rat infecting and human infecting strains. This will also have an important bearing on subsequent drug testing with animal models," Edman adds. Eventually the California scientists intend to pull out the genes that will be targets for drugs.

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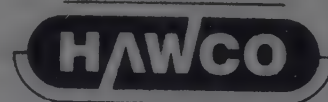
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GAS MONITORS

A robust low in cost controller with flow chart and alarm selection slide switch for three status; low (green), medium (yellow), high (red) similar to traffic signals has been designed after 15 years of R & D efforts by M/s. Subtronics, Bombay.

The following are the features of the unit: Audio alarm only at high status but visual alarm 24 hours monitoring choice. Its controller operates on 230 V.A.C. or 6 volt D.C. only with flame-proof detector at remote place with indicator available. This can be portably operated with 6 volt dry batteries with gas detector head for spot-leak checking of L.P.G. detection.



Single Channel - Three Status - Gas Monitor

The unit has applications as gas/vapour detector alarm, smoke detection, environment monitor, automatic ventilation controller, explosive level detection, air pollution monitor. Useful for hotels, hospitals, chemical and fertiliser plants, pharmacies, computer rooms, synthe-

tic plants, gas based units, gas filling plants etc. It can be set to sound alarm at various L.E.L. (%) or T.L.V. (PPM) levels. Solid-state timer disconnects audio/visual alarm for first one and half minutes and prevents false alarm in case of mains failure.

Subtronics has also introduced a five channel monitor which works on 230 V.A.C. or 6 V.D.C. and low voltage controller. It gives better safety than 12 V.D.C. and has selectable slide switch for audio/visual build-in solid state buzzer, with green (low), medium (yellow) and high (red) LED indicators for three status of gas/fume/vapour leaks with flow chart and individual calibration pot. With reset push switch on front, it monitors concentrations of L.P.G., combustible gases, smoke, hydrocarbons, ammonia, hexane, hydrogen, acetone, benzene, alcohols, esters and many more inorganic gases used for detection as smoke, L.P.G., environment monitor, explosive level, air pollution monitor for hotels, computer rooms, hospitals, pharma, chemical and fertilizer solvent plants, etc. It has facility to func-

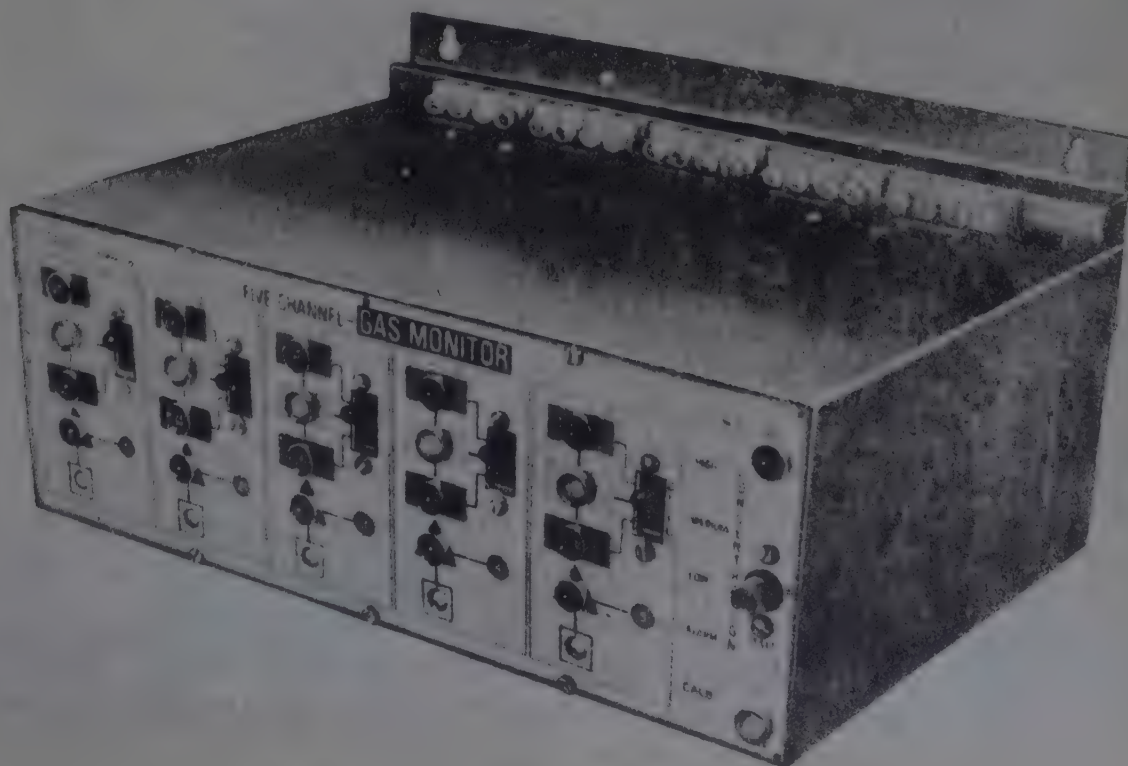
tion five gas detectors (flame-proof also) remotely with independent alarm led-latching. It has 6 volt battery back-up and remote alarm with one and half minutes timer which avoids alarm in case of mains failure. Thus visual indication of rise in concentration without audio alarm is possible. But audio alarm works only at high (red) status. It is available in Lel (%) and TLV (ppm) with various ranges e.g. low (0-100 ppm), medium (100-1000 ppm) and high (1000-4500 ppm).

Further details can be had from M/s. Subtronics, Kaliandas Udyog Bhavan, Unit No. 147, Near Century Bazar, Prabhadevi, Bombay-25.

TAILORING EPDM FOR CURED EXTRUSIONS

Advances in suspension polymerization technology have made it possible to tailor-make EPDM rubbers for continuously vulcanized extruded profiles.

'EPDM polymer and compound developments for extrusion and con-



Three status - Gas monitor with 1.5 min timer

tinuous cure covering a hardness range of 25-95 Shore A' is the subject of a recent edition of Polynotes, published by the Polysar Technical Centre, Antwerp, Belgium.

The paper offers technical guidance for compounders in selecting parameters needed to successfully extrude and cure complicated profiles. These requirements extend over a wide range of hardness, with continuous vulcanization including UHF, LCM shearhead or hot air cure. The extrusion process has become so technically advanced that compounding requires special skills to achieve the best technical performance.

Selection of a particular EPDM for extrusion compounds is influenced by its ability to give needed properties when compounded; ease of processing, overall cost of the compound, and availability of the EPDM. The compounder must consider these factors when choosing the grade that will best suit his needs.

The special properties produced by high molecular weight in the polymer offer advantages for continuous vulcanization processes, the article states. Higher compound Mooney viscosities and thus better collapse resistance is a major benefit. Better physical properties is another. By using oil extension techniques, easy processing is also achieved.

The article explains trends in EPDM selection and compounding for low, medium and high hardness extrusions, along with recommended recipes based on three types of Polysar EPDM rubber. Continuous pressureless vulcanization is a fast-growing curing technique. In this process, shaping, curing and finishing are all done in a single operation. Details of the principles of continuous pressureless vulcaniza-

tion are discussed in the article, as is the role of high molecular weight in providing collapse resistance. Other subheadings include typical temperature settings for EPDM extrusions, and compounding of low, medium and high hardness EPDM compounds.

Polynotes is published by the Polysar Technical Centre NV, P.O. Box 354, B-2000, Antwerp, Belgium.

NON-SHRINK TWO-COMPONENT ADHESIVE

Bolidt Kunststoftoepassing B.V., in Alblasterdam, the Netherlands (Post Box 55, The Hauge), has developed a new type of two-component adhesive based on solvent free epoxy resins. The new product is marketed under the brand name of 'Bolilock E'.

Before use, the two components have to be thoroughly mixed into a homogenous mass in the proportion of 2:1. Bolilock E is a filler-like, non-shrink synthetic adhesive for the bonding of concrete, steel, board, wood, roughened polyester, etc.

Favourable Properties: After curing, Bolilock E forms an exceptionally strong adhesion with these materials. The new products does not age, is resistant to a large number of chemicals and to water, and exhibits no shrinkage after curing. Bolilock E is totally watertight in layer thicknesses of 2 mm and more. Bolilock E adheres exceptionally well to concrete, steel and stone and stone-like materials. The bending strength of the adhesive is 45 N/mm², its compressive strength is 95 N/mm².

Bolilock E cures within 24 hours at temperatures above 10°C, and after approximately 48 hours at temperatures between 5 and 10°C. Optimum curing is completed after seven days. Bolilock E is supplied in 1 kg

and 5 kg packs with pre-dosed components. Bolidt supplies a comprehensive and varied range of synthetic products, which are used for concrete repairs by means of synthetic resin mortar, shot concrete or injecting synthetic resin, for the bonding of concrete structures, concrete and steel connections, foundation bases, preservation by means of protective coatings, the application of floor systems in utility building, the construction of sports floors, etc.

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Reliance Electronic has introduced electronics thermal wire stripper. The hand-operated stripper has been designed to remove the insulation of PTFE, PVC and any other type. It meets the high production rate with consistently high wiring reliability as per MIL specification. It leaves wire free of oxide, nicks or deformations of any kind. It is more valuable when working with high gauge wire.

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NEWS FROM ABROAD

PETKIM STUDIES \$1.6BN INVESTMENT PLANS

Petkim, Turkey's state-owned petrochemical company, is studying plans for investments which could cost over \$1.6bn and more than double the group's ethylene capacity by the end of the century.

The plans involve a two-phase investment programme suggested in a report — the so-called Masterplan — prepared for Petkim by consultant Chem Systems International. Earlier this year, Petkim chairman and managing director

Dr. Faruk Yagiz revealed that the report was in preparation and would evaluate the group's current and future investment opportunities.

According to Dr. Yagiz, the investment plans could enable Petkim to make some quick returns and prepare for future. He said the first phase, running from 1989 to 1993, would involve minor technical modifications and debottlenecking of both upstream and downstream units. He estimated the cost of the first phase to be around \$200m. The Petkim

managing director also said that work on the first stage would start immediately, adding that provision had already been made in 1989 investment budgets.

In the second stage of investment currently being studied, Petkim would build a new 450,000 ton/year naphtha cracker and associated downstream units. This has been scheduled for the period from 1995 to 2000, but as R Ozcan Besergil, head of Petkim's technical consulting group, explained, the go ahead and timing would depend on market conditions.

According to Besergil, phase one plans relate to Petkim's Aliaga and Yarimca sites. But in the second phase, it is not yet decided whether to build a new complex or add to the existing operations at Aliaga near Izmir.

Local sources point out that Turkish demand for chemical products is likely to rise rapidly over the next 10 years and that most or all of the extra capacity envisaged in the plans would be consumed domestically.

In phase one, capacities at Aliaga for the existing cracker, the low density polyethylene (ldPE) and polypropylene (PP) units could all be increased by around 10 per cent each, Besergil explained. At present, ethylene output is around 325,000 ton/year, ldPE 150,000 ton/year and PP 60,000 ton/year. Output of hdPE, currently at 40,000 ton/year, may be raised by 30 per cent.

The technical executive said that Petkim was also considering raising acrylonitrile capacity from around 77,000 ton/year to 90-100,000 ton/year and increasing ethylene glycol production, currently around 68,000 ton/year, by

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At the group's original complex, Yarimca near Izmit, plans include an expansion of carbon black capacity by 20,000 ton/year to 50,000 ton/year and a rise in polystyrene (PS) output by 6,000 ton/year to 24,000 ton/year. PVC output may also be raised by some 13,000 ton/year to 60,000 ton/year.

Phase one also contains plants for two new units at Aliaga. These are a 100,000 ton/year styrene monomer facility and 60,000 ton/year PS unit.

Besergil said that the second phase of investment would include a cracker and world scale units for acrylonitrile, PVC, VCM, chlorine, PP, PS, hdPE and or lldPE, and ldPE. Dr. Yagiz said that many of the first phase plans would cost very little and could be funded from Petkim's existing resources, but major expenditure will have to be sanctioned by whichever group or groups control Petkim following privatization.

One observer suggested a decision on the siting of the second phase would favour expansion at Aliaga. Land is available for new building and existing infrastructure would provide lower costs than a completely new site. A third site, possibly in the south east of Turkey near Adana, could still be a possibility.

At present, the housing development and public participation administration, a government body which oversees privatization in Turkey, is deciding which bank will assist in the planned Petkim flotation. According to ECN sources in Istanbul, the list has now been narrowed to six including Morgan Grenfell, Samuel Montagu, Shearson Lehman Hutton and Bankers Trust. A final decision is expected by the end of September.

PHOS ACID HIKE

Chinhae Chemical of South Korea has selected Norsk Hydro Licensing technology and Lurgi engineering for the retrofit of its Prayon phosphoric acid plant. The existing 66,000 ton/year unit will be upgraded and capacity boosted to 82,500 ton/year by the end of 1989 in a contract worth around \$5m.

Norsk Hydro Licensing UK will supply its hemidihydrate (HDS) process and provide process engineering services during the design and start up phases. Basic engineering and advisory services will be provided by Frankfurt-based, Lurgi.

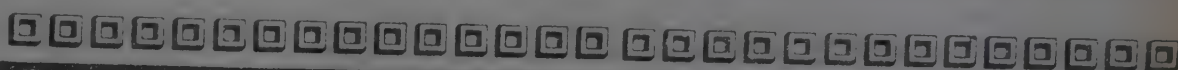
After the work is completed, concentrated phosphoric acid suitable for direct use in a downstream diammonium phosphate plant will be the output, eliminating the need for further purification and concentration. The improvements will increase the phosphate recovery efficiency to 98.5 per cent.

PPG TO ACQUIRE GROW GROUP

PPG Industries has agreed to acquire Grow Group in an attempt to revive its lacklustre trade paints operations in a deal worth nearly \$233m.

Grow, a New York city-based manufacturer of trade paints and

(Contd. on p. 94)



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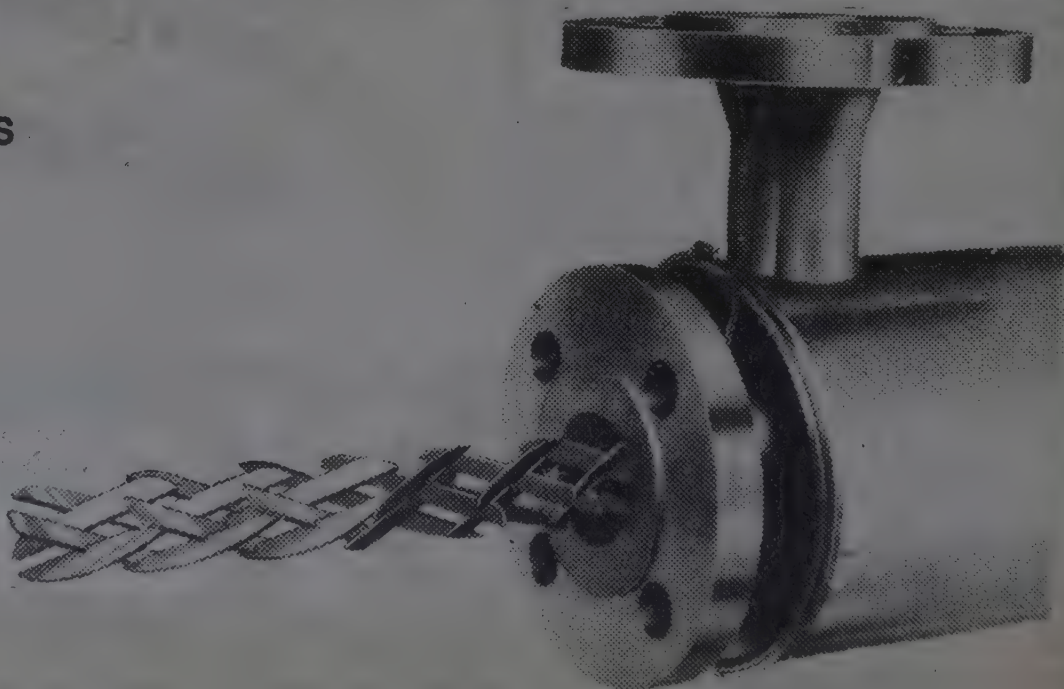
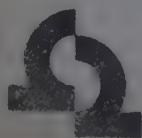
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(Contd. from p. 91).

chemical coatings, has sales in excess of \$380m. It will be merged with PPG's coatings and resins group.

According to a company spokesman, Pittsburgh-based PPG is looking to benefit from Grow's marketing strength in trade paints as well as providing additional manufacturing facilities, mainly in the U.S. PPG has undertaken rationalization of a \$150-200m business in which it has been struggling to compete against much larger players. The global market for trade paints is worth between \$15-17bn/year.

In the coatings and resins sector overall, PPG figures as a major international player. Sales in 1987 were \$1.7bn and the company claims to be the world's leading supplier of automotive and industrial finishes.

In addition to its coatings activities, which cover the architectural, marine and maintenance, and automotive paints sectors, Grow manufactures a range of consumer products. PPG is currently looking at this latter business which comprises more than a third of Grow's total sales, and

will probably seek a buyer as it does not fit with its existing activities.

Under the terms of the agreement, PPG will acquire about 14m shares for \$16.625/share and has an option to purchase a further 2.8 unissued common stock at the same price. PPG has the right to terminate the merger agreement during a due-diligence period ending September 6, 1988.

RHONE-POULENC EXPANDS SILICONES WITH ICI ASSETS

ICI is to shed another of its non-core businesses through the sale of its silicones operations to France's Rhone-Poulenc. Terms were not disclosed, but sources estimate the value of assets sold to be around £30m (\$51m).

The deal, marking ICI's exit from an area in which it has less than a 5 per cent share of the £-500m/year European market will enable the French firm to consolidate its position as a leading silicones producer.

Rhone-Poulenc will take on ICI's production facility at Ardeer in Scotland together with

support operations in Leatherhead, UK and Everberg, Belgium. The French state-owned group's existing silicones business operates on a worldwide basis.

Rhone-Poulenc did not give a sales figure for the silicones division nor would it reveal its market share. But the company has indicated that it is committed to building up its core businesses into a leading international force. Earlier this year it took a majority stake in Spain's Siliconas Hispania while the acquisition last year of the Stauffer basic chemicals business from ICI included some silicones operations.

It is also believed that the company is considering further expansion, possibly through the construction of a new facility.

On a global scale, the silicones market is valued at around \$3bn/year with demand growth put at between 6-8 per cent.

According to ICI, it was facing increasing international competition from rival producers and both the scale and age of its operations meant the business was no longer viable. Rhone-Poulenc may have to take some measures

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to rationalize and modernize business but says the acquisition is a good fit. It will widen the group's product range and introduce new technology to parts of the silicones division.

The ICI business comprises a range of intermediates and performance chemicals including antifoams, emulsions, greases, components for sealants, masonry water repellants and release coatings for paper and plastic films.

NEW BACKERS FOR KWINANA SITE

The West Australian government and Bond Corp are joining forces to bail out the original backers of the Kwinana petrochemical project.

The deal is reported to be worth around Aus\$350m (\$290m). Bond Corp, owned by Australian entrepreneur Alan Bond, is expected to take a majority stake in the complex.

The state opposition party and local business groups have criticized the government's involvement in the project. But the economic benefits persuaded the government to provide backing for the deal: export income generated by the project could be worth more than Aus\$250m/year.

The complex includes plans for the production of 145,000 ton/year ethylene, 200,000 ton/year caustic soda, 237,500 ton/year vinyl chloride monomer and 100,000 ton/year ethylene dichloride (EDC).

The new owners will attempt to keep to the original construction schedule, with work due to begin in October for a mid 1991

start up. Japan's JGC Corp and Clough Engineering of Perth have been appointed engineering contractors while Chiyoda Chemical Engineering & Construction is acting as the main sub-contractor on the project.

A marketing deal has been signed with Japan's Mitsubishi for the sale of the facility's EDC/VCM output. But reports that the company plans to take a stake in the project have been denied by Mitsubishi.

PENNWALT PLANS

Pennwalt's sale of its drugs division to Fisons for \$460m last week is a major step in the US firm's strategy to refocus on its chemicals portfolio. The company is still in discussions to sell its equipment business.

It is not clear whether the investment group Centaur will turn its attention away from the company now that the Fisons deal has been announced. Observers reckon that the group — which is rumoured to have built up its 7.6 per cent stake in Pennwalt to 8.5 per cent — was looking to make a quick profit from the acquisition and subsequent break up and sale of an undervalued business.

Meanwhile, Pennwalt says it will seek to enhance shareholder value through a stock buyback and/or a special shareholder dividend payment with the cash from the Fisons deal.

Once the company has had time to sit back and consider its future — assuming that possible bid rumours involving companies including Ethyl Corp do not materialize — it is believed that Pennwalt could step up its acquisitions programme. Sources say

that the company has been eyeing a number of potential acquisitions that would expand its chemicals operations, possibly focusing on its European agrochemicals business.

GURIT CONTINUES PURSUIT OF ESSEX

Swiss textiles and chemicals group, Gurit-Heberlein has launched a new, 100 per cent takeover bid for US speciality chemicals maker, Essex Chemical. The bid is worth \$32/share or \$232m. The Essex board is due to consider the bid at a meeting this week.

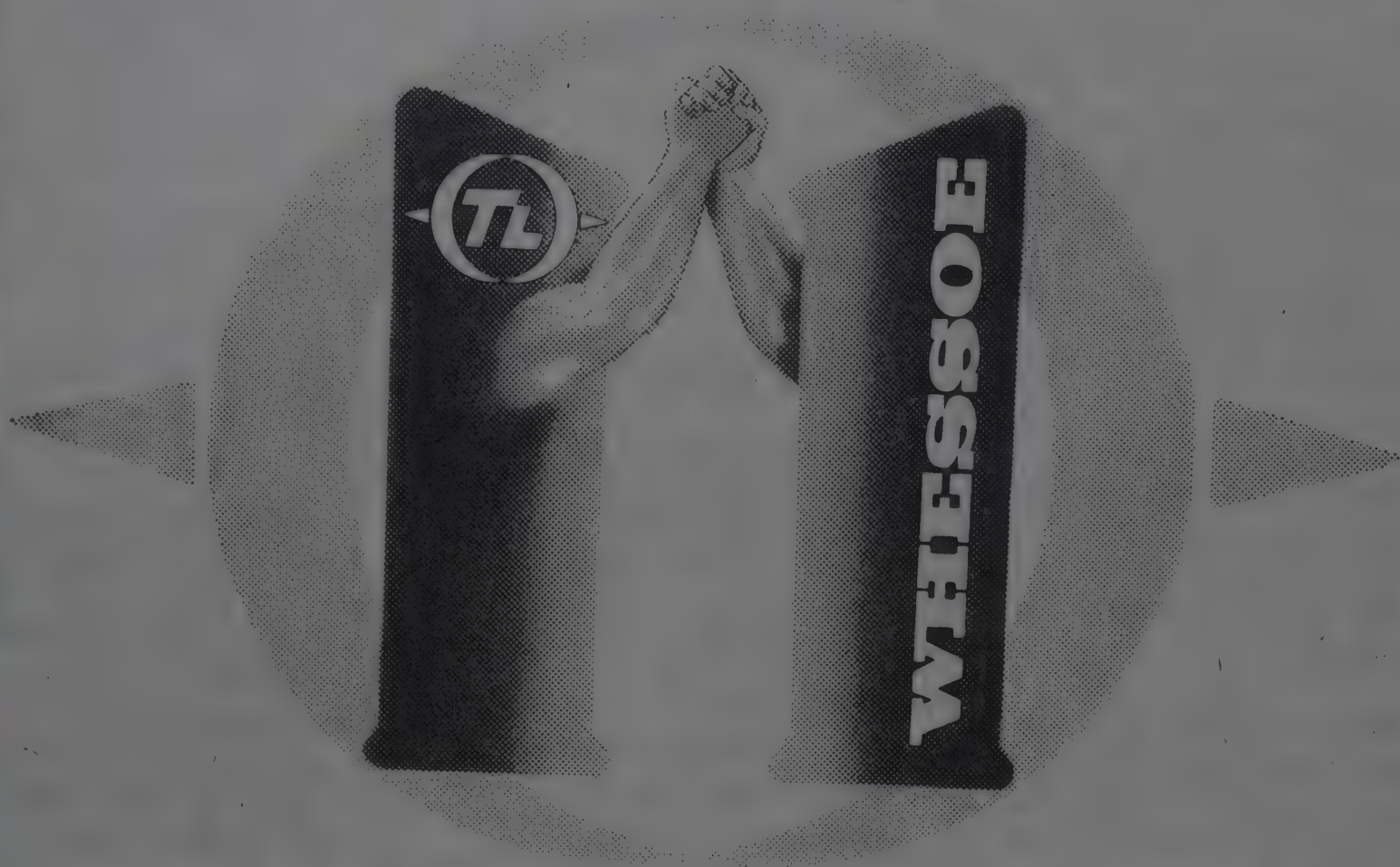
In June, Gurit launched a \$24/share bid, later raised to \$30/share, for 61 per cent of the US group. But Essex has challenged these earlier bids, claiming that Gurit violated US federal securities law and had based its takeover effort on information gained through a joint venture with the US group.

A US court blocked the Swiss group from proceeding with its bid for Essex and this was upheld by an appeal court last week. The case has now been referred to a London court but no hearing date is set.

Gurit is confident Essex will accept the new bid, but it is still unclear whether the pending legal action could hamper progress. The Swiss group claims information used for its original bid was disclosed by Essex following a loss of \$16.6m last year.

Meanwhile, Essex has announced that talks with a third party on the sale of a substantial part of its business may not lead anywhere. This may signal a weakening of Essex's opposition to the Gurit bid.

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NEWS FROM JAPAN

Nissui Obtains sales Rights for Pasteur's Diagnostic Reagents.

Nissui Pharmaceutical Co. has obtained the exclusive sales rights for Japan for diagnostic reagents developed by L' Institute Pasteur of France. As a first step, the Japanese firm began marketing July AIDS-antibody diagnostic reagents in Japan.

Under the agreement, Nissui will also import and market Pasteur's AIDS-antigen and hepatitis diagnostic reagents in future. Nissui has secured a footing in the Japanese immunological-clinical-reagent market, particularly for enzyme-immunoassay, and this has led to the agency contract. The Japanese firm intends to expand the relationship with the French Institute to a technological tie-up and joint development for new reagents in future.

The reagents developed by the French institute have been produced by Diagnostics Pasteur, a French Joint venture between L' Institute Pasteur and Sanofi group, and have been imported into Japan through Sanofi Japan Co., a wholly owned Japanese subsidiary of L' Institute Pasteur. Nissui has also become a Japanese sales agent for Sanofi Japan.

New Standards For Safety Tests of Medical Supplies Targeted.

The Ministry of Health and Welfare has formed a study team aimed at establishing safety-test methods for medical-use materials and equipment. It is scheduled to work out related guidelines within about two years.

Standards for toxicity tests of a few medical supplies — pacemakers and artificial blood vessels, etc. — have already been established but there are still none for artificial bones, tooth roots and joints, even though use of all of these has spread rapidly. They need to have good compatibility with the living body and the ministry has reached the conclusion that it is unreasonable to leave related safety tests to private businesses.

International Standardization Organization (ISO) has also started working out similar guidelines and the ministry envisages coordinating the expected domestic standards with the international ones.

The said guidelines will cover acute-toxicity and transplantation tests, in which elution of metal contents from medical-use equipment implanted in the body, its carcinogenicity and compatibility with human tissue will be examined. The study team will establish unified test methods for each material (metal, silicon, apatite and ceramics, etc.) and application type (implantation and contact types, etc.).

Mitsui Petrochemical to add Large-scale PTA Plant

Mitsui Petrochemical Industries Ltd., is considering building a 200-250,000-t/y high-purity terephthalic-acid (PTA) plant at its Iwakuni factory at a total cost of several billion yen. This is because demand for the product is growing in South-east Asia and Japan for use in the production of synthetic fibre and PET resin/film, respectively.

The company will reach a conclusion by the end of September. It envisages starting construction immediately after that, and beginning deliveries both at home and abroad in the fall of 1990.

On completion of the new plant, the company's combined PTA production capacity will amount to 470-520,000 t/y, so it will become the world's 3rd-largest PTA producer, following Amoco Chemical (U.S.: 1,400,000 t/y) and Mitsubishi Chemical Industries (570,000 t/y).

The company has a 270,000-t/y PTA plant at the Iwakuni factory. This plant is based on the Amoco process, in which raw material p-xylene is oxidized in air; the resultant product is dissolved in water at high temperature and under high pressure and hydrogenated for refining purposes in the presence of precious metal catalysts. In an effort to enhance cost competitiveness it built last year a large-scale pilot PTA plant in co-operation with Amoco and is tackling development of an efficient manufacturing process. A new process may be employed for the planned new plant.

Global PTA demand is increasing at an annual rate of 4% and reached 8,500-8,700,000 tons a year (DMT-demand included). Polyester fibre plants are being briskly built in S. Korea, Taiwan & other Southeast Asian countries and, as a result, Japanese PTA producers have received many inquiries for PTA exports from these countries.

ABS-resin Demand Rising Sharply this year

Demand for ABS resin was on a sharp increase centred around domestic demand in the first half of 1988 and showed a 7% rise over the same period of the previous year, exceeding the original

estimate. In particular, demand from OA-equipment industries such as for printers, facsimiles and personal computers registered 2.5 times as much as in the same period of the preceding year, along with increased demand for automobiles and household electrical appliances. Thus, each manufacturer adjusted its estimate of the growth rate in the latter half of the year to 8% — a big jump up from 1-2%.

Meanwhile, supply of ABS resin is still tight, reflecting lack of styrene monomer, and domestic demand is being met only by decreasing that for exports. It had been said that import pressure, caused by the yen's appreciation and increased production in Taiwan, will change the domestic supply structure of ABS resin. However, this concern has disappeared now due to the

world-wide increase in demand for petrochemical products and lack of source materials, such as styrene monomer and acrylonitrile.

Demand for automobiles, on the other hand, has registered an 18% increase over the previous year thanks to consumers' tendency toward high-grade cars, although it had been considered to show stagnant growth. It can be said that increased demand for automobiles and OA equipment is fully covering decreased demand for VTR and audio cassette tape and combined demand for automobiles and OA equipment will grow by around 10%.

As a result, production throughout this year is most likely to register over 540,000 tons, exceeding the original estimate of 512,000 tons.

Sumitomo, Kawasaki Steel Tie up for Optical Disk Operations

Sumitomo Chemical Co., and Kawasaki Steel Corpn. have agreed on joint optical-disk operations. The former is scheduled to supply 5.25 inch DRAW-type optical disks having Te-based recording film to the latter, which will introduce format technology from Information Storage Inc. (U.S.) and put formats into optical disks using the U.S. technology. The latter plans to incorporate them into its own KL-20 disk system and market them.

To date the U.S. company has imported virgin disks from Sumitomo Chemical and put formats into them: the resultant products have been supplied to Kawasaki Steel, which has marketed them in combination with disk drives. The two Japanese companies intend to step up marketing of optical disks and related disk systems through the business tie-up.

Sumitomo Chemical started in July, 1985 mass-producing the said disks mainly on an OEM basis. The company has already supplied a total of several thousand pieces of the product to a few companies including Kawasaki Steel and TEAC. It has also tied up with Sumitomo Metal Mining Co., and Hoechst Celanese Corp. (U.S.) with regard to commercialization of magnetic optical disks and organic dye-based ones, respectively.

Kawasaki Steel began in April last year to manufacture optical disk drives and related equipment by obtaining from the U.S. company a license for a 5.35 inch DRAW-type optical-disk system. It has already marketed a total of 250 units of the disk system equipment.

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New Developments From Japan

Asahi Glass Bares Solid Laser Featuring Semi-conductor-Laser Excitement

Asahi Glass Co. has developed for the first time in Japan an ultrasmall solid laser featuring semiconductor Laser excitement and has begun application studies for use in pickups for magneto-optical disks and medical instruments using lasers.

This laser is said to have solved problems related to the limited size of solid lasers, insufficient brightness of the monochromatic light of semiconductor lasers, and their weak peak power. Consequently, the company hopes that the new laser will not only replace other equivalents but also create a new market by finding new outlets.

The development comes from the combination of Asahi Glass optical single-crystal technology and optical module technology accumulated over many years as a result of manufacturing sophisticated high-tech products. The new solid laser using a semiconductor laser for excitement can be made very compact and features high efficiency and reliability.

It produces green light and attains high peak power in combination with "micro-Q switch" developed by Asahi Glass.

The company intends to carry out mass production and attain sales of several hundred million yen in 1990.

Kawasaki Makes Ferrite Carrier, Copier Toner-Use Magnetite

Kawasaki Steel Corpn. has constructed two 40-t/m plants — one each for ferrite carrier and toner magnetite — and has be-

gun marketing their production.

The company advanced into temporary-burning hard ferrite in July 1985 and has since supplied the products to audio-and-video-equipment makers. The ferrite carrier developed by Kawasaki is of high quality and is low-priced, it says. It has also developed toner magnetite for use in copiers. The Japanese market for copier-use toner has been expanding at a fast pace (2-digit year-on-year growth) in recent years and the company intends to obtain a 20% share of the market.

It also plans to add 60-t/m ferrite-carrier capacity to the new 40-t/m plant by April 1990 in a bid to secure a 10% share of the domestic market.

Compared with conventional 2-stage processes for ferrite-carrier manufacture, Kawasaki's method features a single stage comprising material adjustment, drying and granulation, and burning as well as high-quality products and low production costs. The products are available in 22 grades with respect to electrical resistance and saturation flux density.

The ferrite carrier being produced by Kawasaki has an average particle diameter of 80-100 microns while the toner magnetite it has developed has an average diameter of 0.3-0.5 microns.

Suntory to Shift alpha-hANP production method to recombinant DNA Process

Suntory Ltd. has decided to switch the production method for



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its atrical natriuretic peptide (alpha-hANA) now being subjected to Phase-II clinical testing from chemical synthesis to a recombinant-DNA process. The company has been considering the feasibility of the process shift, while continuing the clinical testing that started in March 1986.

As a result, the company will restart clinical tests for the agent from square one.

alpha-hANP which occurs in atrical fibrocytes and contains 28 amino acids has been separated and identified by Professor T. Matsuo of Miyazaki Medical College. He has also succeeded in cloning the substance which has proved to be effective for cardiac insufficiency, kidney diseases and hypertension.

Very High-quality Gas Filter For IC Clean Rooms Developed

Nihon Cement Co. has developed what it says is an extremely

high-performance ceramic gas filter featuring excellent thermal and pressure resistance and gas separation. The development comes from the technological background the company has accumulated over many years with regard to advanced ceramics and ceramic filters for liquid separation.

The new filter is claimed to entirely separate particles having a size of more than 0.01 micron in a gas — an advantage no other equivalent has. The company hopes the filter will be accepted by IC-chip makers which require a greater degree of air cleaning for chip manufacture.

The air-cleaner market in Japan is worth about Y4 billion, with yearly growth from now on of more than 10% expected, mirroring the expansion of semiconductor business. The company has targeted sales of Y100 million for the initial year.

Technical Research on Vacuum Ultraviolet Rays Inaugurated

A 3-year project aimed at developing fundamental technology for high-intensity vacuum ultraviolet rays has been inaugurated under the leadership of MITI and the Science and Technology Agency. Universities and private businesses are expected to join the project, so it will be implemented with the co-operation of the government, industry and universities.

They plan to pioneer a laser plasma-applied source for high-intensity rays, reflectors and spectral devices, all of which can be applied to vacuum ultraviolet rays.

In a related development, they also plan to gain confidence with regard to developing analysis technology based on a soft X-rays-applied micro-scope — which has high space-analysis capability — and quantum-excitation technology, which is capable of exciting specific molecules by means of rays with a given wavelength, thereby synthesizing new compounds.

The 3-year project is intended to improve leading-edge scientific technology for handling novel materials, information and life science etc.

Vacuum ultraviolet rays have such short wavelengths (0.2-200 nm) that they have high space-analysis capability. In addition, they act briskly upon materials, so they produce a wide variety of chemical reactions. Researchers and industrial circles have earnestly hoped for technical development for high intensity vacuum ultraviolet rays but the research concerned involves a great deal of risk and it is quite difficult for a private business to take on this risk by itself.

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MARKET INFORMATION

Bromine Liquid, Propylene Glycol Shoots

Acute shortage of liquid bromine shot prices up from Rs. 55 per kg. to Rs. 80 per kg. Propylene glycol also shot up by Rs. 3 to 4 per kg. following shortage.

The tight supply scene in solvents, benzene, toluene, xylene continued.

Rumours of anticipated price rise by manufacturers of phthalic anhydride spurred prices by Rs. 2 per kg.

On the dyes intermediates front, with the rise in aniline prices, meta ureido aniline rose from Rs. 160/- to Rs. 180 per kg. J. acid went up

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

Rs. 10/- and cyanuric chloric (Imported) went up by Rs. 5 per kg.

(Prices as on 29th September 1988)

INDUSTRIAL CHEMICALS	Per kg				
Ammonium sulphate	2.00	Bleaching powder (33% Cl)	4.10	Calcium chloride 36% (Anhydrous)	5.00
Ammonium phosphate (Mono)	14.50	Borax (Granular)	13.50	Calcium Carbonate PPT	3.00
Ammonium phosphate (Di)	12.00	Borax (Powder)	21.00	Calcium carbonate (Activated)	3.55
Ammonium carbonate (Di)	17.00	Boric acid (Tech)	22.00	Camphor (Indian)	90.00
Ammonium bicarbonate	5.60	Bisphenol-A	70+ST	Cresylic acid	50.00
Ammonium chloride	3.00	Butyl carbitol	50.00	Cream of Tartar. (Tech.)	70.00
Ammonium nitrate	6.50	Caustic soda (Flakes)	8.60	Citric acid (Belgium) (Resale)	42.00
Arsenic white powder	21.00	Caustic soda (Solid)	8.70	Citric acid (Indian) (Resale)	42.50
Acrylamide (Resale)	61.00	Caustic soda (Lye)	7.00	Copper sulphate	21.00
Barium carbonate	6.00	Calcium chloride 70% (Solid)	3.25	Chromic acid	48.00
		Calcium chloride 75-80% (fused)	3.50		

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Telex : 041-6503 RAM IN

Ethylene urea	58.00	Sodium sulphate (Fine)	6.00	Butyl stearate	36.00
Ferric chloride (Lumps)	7.00	Sodium sulphate (Coarse)	5.00	Butanol	(Resale) 32+ST
(Anhydrous)	16.00	Sodium sulphide 50-52%		Benzyl Alcohol	60.00
Glue flakes	8.45	(Flakes)	11+ST	Benzyl chloride	34.00
Glue sheets	6.75	Sodium sulphide 58-60%		Benzo trichloride	16.00
Gohsenol GH-17	130+ST	(Flakes) (TCL)	19.00	Benzoyl chloride	22.00
Hydro	42.50+ST	Sodium sulphide pure (Flakes)	12.25	Bromine Liquid	80.50
Hyflosupercell	25+ST	Sodium nitrite (Resale)	680.00	Chloroform	26+ST
Hexamine (Resale)	40.00	Sodium chloride 80% (Spain)	80.00	Carbon Tetrachloride	17.00
Industrial Wax	25.00	Soda Ash (Tata)	4.10	Cellosolve	47+ST
Litharge	15.00	Soda Ash (Birla)	3.95	Cyclohexanone	50+ST
Lead Acetate (Tech)	28.00	Soda Ash (Imp.)	3.80	Cyclohexanol	52+ST
Lithopone	18+ST	Soda Ash (Imp.)	3.50	Diacetone	(Resale) 35.00
Magnesium chloride (Crystal)	1.00	Sodium bicarbonate	6.00	Diethyl Oxalate	34.00
Menthol crystal (Flakes) 400+Ex.+ST		Sodium bisulphite	4.50	Diethylene glycol (DEG)	43+ST
Menthol bold	365+Ex.+ST	Sodium silicate	3.00	Diethyl Phthalate	52.00
Menthol crystal bold	395+Ex.+ST	Sodium acetate	6.00	Diallyl Phthalate	56.00
Magnesium carbonate (Japan)	16.00	Sodium alginate	160+ST	Dimethyl Phthalate	28.00
Magnesium carbonate (Indian)	15.00	Titanium Dioxide (Anatase)	60+ST	Diethyl Adipate	52.00
Maleic Anhydride (per kg)		Titanium Dioxide		Dibutyl Adipate	42.00
(Resale)	44+ST	(Rutile — RCR ₂)	80+ST	Dipentene	15.00
Mercury (175 lbs)	9600.00	Tartaric acid (Crystal)	94.00	Dimethylamine 40%	12.00
Nickel chloride	90.00	Trisodium phosphate	4.80	Dimethylamine 60%	14.00
Oxalic acid (Resale)	22.00	Thiourea	78+ST	Ethyl Acetate	19.00
Peppermint oil		Urea (Tech)	2.75	Ethyl Acrylate	54.00
(Rectified)	195+Ex.+ST	Zinc Dust	30.00	Ethylene Dichloride	11.00
Potassium carbonate (Indian)	20.00	Vacuum salt	1.00	Ethylene Glycol	43+ST
Potassium carbonate (Imported)	24.00	Zinc Oxide	30.00	Formic Acid (Imp)	(Resale) 29.00
Potassium bichromate	26.00	Zinc chloride powder		Formaldehyde (Resale)	7.00
Potassium phosphate (Mono)	14.00	(technical)	14.00	Glycerine (CP)	53.00
Potassium phosphate (Di)	14.00	Zinc sulphate	4.00	Glycerine (IW)	48.00
Polyvinyl alcohol (No. 117)	120+ST			Hydrogen peroxide 50%	
Polyvinyl alcohol (No. 173)	129+ST			(Resale)	26.00
Polyvinyl alcohol (No. 208)	150.00			Isopropyl Alcohol	21.00
Paraformaldehyde (Resale)	23+ST			Iso Butyl Alcohol	28.00
Phthalic anhydride 36%				(Resale)	30.00
(Resale)	24.00			Monoethanolamine (Resale)	52.00
Pentaerythritol (Resale)	48.00			Melamine	43+ST
Paraffin wax (Resale)	14.50			Methyl Ethyl Ketone	48.00
Rangolite (German)	50+ST			Methyl Isobutyl Ketone	36.00
Rangolite (Czech.)	54+ST			Methyl Acrylate	42.00
				Methyl Dichloride (Resale)	23.00

SOLVENTS Per kg.

Acetic Acid (Glacial)	(Resale) 20.50
Acetic Anhydride	(Resale) 28.00
Acetone	(Resale) 17.00
Adipic Acid	55+ST
Aceto Acetanilide	50.00
Aniline Oil	(Resale) 48+ST
Benzoate Plasticiser	45.00
Butyl acrylate	84+ST

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Polyethylene Glycol (No. 400)	42.00
Polyethylene Glycol (No. 500)	42.00
Polyethylene Glycol (No. 1600)	14.00
Polyethylene Glycol (No. 4000)	38.00
Polyethylene Glycol (6000)	50.00
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Styrene monomer	46+ST
Sorbitol	16.00
Sulphuric Acid	2.10
Trichloroethylene	28.00
Triethanolamine (Resale)	52.00
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Turkey Red Oil (50%)	11.75
Vinyl Acetate Monomer	43.50

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Benzene	19.50
N-Heptane	8.00
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Methanol	9.00
Solvent Naphtha Heavy	10.50
Solvent Naphtha Light	8.50
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2-Amino-4-Nitrophenol	150.00
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Beta Naphthol (Atul)	65.00
Benzidine Dihydrochloride (BDH)	85.00
Bromamine Acid	400.00
BON Acid	140.00
Chicago Acid	300.00
Coach Acid	60.00
C. Acid (Imp.)	260.00
Cyanuric Chloride (Japan)	125.00
2, 4, DNCB	30.00
Dihydrothio PTOS (Imp)	600.00
Dimethyl Aniline	68.00
Diethyl Aniline	155.00
Diamino stilbene disulphonic acid	143.00
3, 3-DCB (Imp.)	180.00
Gamma Acid (Atul)	185.00
H. Acid (Atul)	155.00
G. Salt	65.00
Isophthalic Acid	45.00
J. Acid	275.00
J. Acid Urea	300.00
K. Acid	105.00
MDPS (German)	190.00

MNA	95.00
Meta Ureido Aniline	180.00
MPD(Japan)	210.00
Para Anisidine (PA-Local)	100.00
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N-Methyl J. Acid	410.00
N-Methyl Aniline	120.00
Naphthalene (Refined)	23.00
Ortho Anisidine (OA Imp.)	87.00
Ortho Dichloro Benzene (ODCB)	11.25
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Para Dichloro Benzene (PDCB)	18.00
Para Anisidine (PA-Imp)	110.00
Para Anisidine (PA-Local)	100.00
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Para Cresidine (Imp.)	335.00
Para Amino Azo Benzene (India)	150.00
PNCB	33.00
Para Amino Acetanilide	155.00
1-Phenyl 3-methyl-5-Pyrazolone	125.00
Phenyl J. Acid	350.00
Para Amino Benzoic Acid	170.00
PT Base	93.00
Rhoduline Acid	510.00
Resist Salt	22.00
Resorcinol	150.00
Sodium Naphthionate	65.00
5-Sulpho-Anhtranilic Acid	64.00
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Bombay Dyes Market

(Prices as on 29th September 1988)

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Golden Yellow HR	181.80
Brill. Yellow H4G	117.85
Supra Yellow H-8GF	168.55
Brill. Yellow HE6G	166.95
Yellow H-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	243.95
Yellow M GR	326.05
Brill. Yellow M4G	177.10
Brill. Yellow M8G	332.30
Yellow M 3R	217.60
Brill. Orange H 2B	241.85
Brill. Red H 7B	157.95
Brill. Orange M 2B	313.15
Brill. Red H 8B	169.45
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.30
Brill. Red H-F3B	243.45
Brill. Magenta HB	167.00
Brill. Red M 5B	98.90
Brill. Red M 8B	173.70
Brill. Pink MB	137.10
Brill. Magenta MB	121.55
Brill. Purple H-3R	180.20
Brill. Purple H-7R	175.40
Navy Blue H 3R	298.50
Brill. Blue H-GR	266.55
Brill. Blue H 5G	173.10
Blue H 5R	233.85
Brill. Blue H 7G	178.70
Brill. Blue H 7RE	253.15
Turquoise HA	334.45
Supra Blue H-3RP	335.70
Supra Turquoise H 2B	181.50
Blue H-ERD	395.80
Navy Blue H ER	258.60
Blue H 5RX	269.30

Navy Blue M 3R	310.95
Brill. Blue MR	331.70
Brill. Blue M RX	214.20
Brill. Blue M-G	382.30
Blue M 4GD	344.60
Navy Blue M RB	318.75
Turquoise M-G	197.85
Brill. Blue M GX	302.50
Blue 3R Acra Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg.)	285.00
Green H 4BD	269.80
Green H-E4BI	169.80
Red Brown H 17	143.25
Orange Brown H 23	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS Per Kg.

Navy Blue	99.85
Green G	198.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc.	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI) Per Kg.

Yellow 5G Powder Fine	673.15
Yellow 5G Supra Dispersa	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr. Fine	624.35
Gold Orange 3G Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disp.	713.20
Brill. Purple 4R Conc. Pdr.	470.75
Brill. Purple 3R Acra Powder	690.85
Brill. Purple 2R Hly Cons.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Cons.	625.95
Blue R Powder Fine	542.15
Blue BC Conc. Pdr. Fine	522.50
Blue BC Acra Conc. Pdr. Fine	762.75
Blue R Conc. Pdr. Fine	577.65
Blue RR Supra Powder	629.35

Blue Conc. Powder	645.80
Brill. Blue 2R Hly. Conc.	378.55
Brill. Blue 2R Supra Disp.	115.65
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp.	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Powder	823.90
Jade Green 2G Pdr. Fine	419.65
Jade Green 2G Ptg. Paste	125.40
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Supra Disp.	496.00
Olive Green B Pdr. Fine	399.90
Olive D Pdr. Fine	444.30
Olive Green B Supra Disp.	308.20
Jade Green XBN Supra Disp. (N)	327.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp.	538.05
Olive R. Pdr. Fine	422.90
Olive D Supra Disp.	361.70
Olive R Supra Disp.	363.90
Olive D. Ptg. Paste	193.00
Olive Green B. Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc.	640.00
Olive Green B Acra Conc.	542.75
Brown R Pdr. Fine	835.00
Brown G. Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
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Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.55
Brown G Acra Conc.	733.95
Brown R Acra Conc.	766.00
Grey M. Powder Fine	768.80
Grey M. Supra Disp.	585.45
Blue BC Acra Conc. Pdr. Fine	762.70
Direct Black AC Supra Disp.	330.30
Direct Black AC Pdr. Fine	474.70
Direct Black CH Supra Disp.	393.20
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI: SEPT. 30 (NNS) — Citric acid and tartaric acid gained sharply by Rs. 100/250 per 50 kg. in the local chemicals market during the last week, on sustained demand by stockists along with fall in import from China and France, says NNS. Menthol prices however, dropped by Rs. 45/50 on slack offtake at higher level. Turnover was moderate.

Citric acid small advanced by Rs. 100 at Rs. 2100/50kg. on keen purchasing and reduced import from China. Citric acid Bombay Dyeing ruled quiet at Rs. 2,400. Chatkolight and rangolite appreciated by Re. 1 at Rs. 54, and Rs. 73 per kg. on dwindling stock position. Sufolight looked up further by Re. 1 at Rs. 57 on poor supply and good demand, by gur khandsari makers. Tartaric acid hardened sharply from Rs. 5,950 to Rs. 6,150/6,200 on bullish advances and fall in fresh import from France. Consumers demand was also good. Camphor powder recorded a sharp rise of Rs. 4 at Rs. 92 and thal quoted higher by Rs. 2 at Rs. 102 per kg. on better demand shown by consumers for ensuing festival, as well as reduced supply by manufacturers.

In the absence of inflow from Assam and heavy purchasing made by

candle makers, paraffin wax marked up by Rs. 20 at Rs. 690 per 50 kg. Mercury suffered a steep fall of Rs. 200 at Rs. 10,600 per flask followed by lower Bombay advices, where mercury declined by Rs. 200 at Rs. 10,300 per flask. Demand was also slack in industrial sectors. Menthol flake and bold tumbled down by Rs. 45 at Rs. 405 and Rs. 505 per kg. on improved arrival from U.P. and fall in demand from Pakistan. Menthol medium nose-dived sharply by Rs. 50 at Rs. 470 on nervous offerings. October delivery menthol flake was transacted at Rs. 430 per kg., Mentha oil slipped from Rs. 335 to Rs. 322 on profit taking selling. Hydrogen peroxide softened further by 25 Paise at Rs. 25.50/29 on good inflow of imported goods.

Titanium dioxide Anatase jumped up from Rs. 65.50 to Rs. 68 per kg. on better demand by stockists due to fall in arrivals from Kerala but at the week-end in the face of increased selling pressure and improved inflow it reacted downward and closed at Rs. 65. Titanium dioxide RC-822 also ruled quiet at Rs. 78. Naphthalene balls marked up by Rs. 25 at Rs. 1,400 on reduced supply. Dyes and colours were traded at their previous week levels.

(DELHI MARKET RATES AS ON SEPTEMBER 30, 1988)

Ammonium Bicarb (per 25 kg)	135.00
Mercury (per flask)	10,600.00
Soda ash (per bag)	280-305.00
Ammonium chloride (per 50 kg)	125-180.00
Caustic soda flakes (per 50 kg)	390-395.00
Citric Acid (per 50 kg)	2100-2400.00
Stable Bleaching Powder Shriram (per 25 kg)	95.00
Stable Bleaching Powder KCl (per 25 kg)	86.00
Stable Bleaching Powder MODI (per 25 kg)	88.00
Sod. Bicarbonate (per 50 kg)	270-278.00
Sod. Hydro Sulphite (per kg)	37-44.50
Rangolite (per kg)	53-73.00

Boric acid Technical (per 50 kg)	1025.00
Paraffin wax (per 50 kg)	690.00
Tartaric acid (per 50 kg)	6150-6200.00
Borax Granular (per 50 kg)	565.00
Borax Crystal (per 50 kg)	580.00
Sodium Nitrate (per 50 kg)	430.00
Sodium Nitrite (per 50 kg)	675-700.00
Camphor Powder (per kg)	92.00
Camphor Thal (per kg)	102.00
Menthol Medium (per kg)	470.00
Menthol Flakes (per kg)	405.00
Menthol Bold (per kg)	505.00
Glycerine (per kg)	47-48.00
Sodium Silicate (per quintal)	200-250.00
Hexamine (per kg)	32.00

Acetic Acid Glacial (per kg)	18-19.00
Copper Sulphate (per quintal)	2300-2500
Formic acid (per kg)	N.A.
Formaldehyde (per kg)	8.00
Hydrogen Peroxide (per kg)	25.50-29.00
Calcium Carbonate (per tonne)	2500-4000.00
Acid Slurry Soft (per kg)	24.00
Acid Slurry Hard (per kg)	32.00
Phosphoric Acid (per 50 kg)	900.00
Pot. Nitrate (per quintal)	900-1200.00
Pot. Permanganate (per 50 kg)	2300.00
Sod. Bichromate (per 50 kg)	1050-1150.00
Tri-Sod. Phosphate (per 50 kg)	350-380.00
Titanium Dioxide Anatase (per kg)	65.00
Titanium Dioxide RC-822 (per kg)	78.00
Zinc Oxide (per mt)	35,000-42,000.00
Phenol Carbollic Acid (per kg)	33.00
Carbon Tetrachloride (per kg)	20.00
Chloroform (per kg)	28.00
Sodium Sulphate (per 50 kg)	160-180.00
Naphthalene Balls (per 50 kg)	1400.00

DYES & COLOURS (per kg)

Naphthol AS	158.00
Naphthol ASG	249.00
Naphthol ASBS	210.00
Naphthol ASTR	320.00
Naphthol ASOL	202.00
Naphthol ASBO	220.00

DIRECT DYES (per kg)

Black E. Conc.	110-160.00
Diazo Black MT	105-130.00
Green B	100-127.00
Blue 2-B	60-92.00
Sky Blue FB	213.00
Basic Auramine	55-110.00
Basic Rhodamine	220-320.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	140-165.00
Acid Orange	45-88.00

Madras Market

The outlook for chemicals have certainly brightened during the last few weeks. With a good monsoon around the chances of increased business for all items are on the cards. The chemicals have started registering an upward trend. The international scene is very much similar and prices have registered a steep increase so much so import of

many items have become uneconomical after payment of heavy import duty amounting to 158% in most cases. Dyes intermediate prices have gone up due to good demand and non-availability of raw material required for manufacture. The situation in Benzene, Toluene and Xylene have not changed.

(MADRAS MARKET RATE AS ON OCTOBER 1, 1988)

Acetic Acid Glacial (per kg)	18.00	Hydrosulphite of Soda — TCPL (per kg)	40.00
Aluminium Sulphate Iron Free (per MT)	1900.00	Hydrosulphite of Soda — IDI (per kg)	43.00
Ammonium Bicarbonate (per 25 kg)	125.00	Hydrosulphite of Soda — BASF (per kg)	44.00
Acid Slurry (Soft) (per kg)	29.00	Hydrogen Peroxide (per kg)	29.00
Ammonium Chloride SPIC (per MT)	2,800.00	Hyflo Supercell (per kg)	24.00
Bleaching Powder (per 25 kg bags)	110.00	Magnesium Carbonate (per kg)	18.00
Borax Granular (per 50 kg)	650.00	Potassium Bichromate (per kg)	26.00
Caustic Soda Flakes — Mettur Chemicals (per MT)	8,200.00	Phosphoric Acid (per kg)	19.00
Caustic Soda Flakes — Andhra Sugars (per MT)	8,200.00	Phthalic Anhydride (per kg)	24.00
Citric Acid (per kg)	48.00	Pentaerythritol (per kg)	52.00
Copper Sulphate (per 50 kg)	1,050.00	Paraffin Wax (per kg)	13.50
Cresylic Acid 98/99% (per kg)	87+ED	Oxalic Acid (per kg)	23.00
Meta Cresol 40/42% (per kg)	39+ED	Soda Ash — TAC (per 75 kg bags)	310.00
Para Cresol 98% (per kg)	67+ED	Soda Ash — TATA (per 75 kg bags)	312.00
Formic Acid (per kg)	27.00	Sodium Cyanide Indian (per kg)	55.00
Formaldehyde (per kg)	9.00	Sodium Cyanide (Degussa) (per kg)	85.00
Glycerine Carbonate (per kg)	45.00	Sodium Bichromate (per kg)	19.00
		Sodium Bicarbonate (per 50 kg bags)	285.00
		Sodium Nitrate (per 50 kg bags)	425.00

Sodium Nitrite (per 50 kg bags)	750.00
Sodium Silicate (per MT)	4500.00
Sodium Sulphate (per MT)	3,500.00
Sodium Sulphide Flakes (per MT)	13,500.00
Sodium Bisulphite (per 50 kg)	4,000.00
Stearic Acid (per kg)	29.00
Trisodium Phosphate (per 50 kg)	350.00
Titanium Dioxide — Indian (Rutile) (per kg)	64.00
Titanium Dioxide — Imported (Rutile) (per kg)	85.00
Urea Tech (per MT)	2800.00
Zinc Oxide (per kg)	34.00
Zinc Chloride Powder (per kg)	14.00
Zinc Sulphate (per MT)	4,500.00
Di-octyl Phthalate (per MT)	46,000.00
Dibutyl Phthalate (per MT)	46,000.00
Hexamine (per MT)	30,000.00

SOLVENTS

Acetone — HOCL — (per kg)	18.75
Acetone — NOCIL — (per kg)	22.00
Diacetone (per kg)	29.00
Diethyl Glycol (per kg)	49.00
Isopropyl Alcohol (per kg)	22.00
Butanol (per kg)	34.00
Benzene — SAIL — (per lit)	18.00
Toluene — SAIL — (per lit)	18.00
Xylene — SAIL — (per lit)	20.00
Phenol — HOCL — (per kg)	29.00
Turpentine (per lit)	16.50
Trichloroethylene — MCIC — (per kg)	24.50
Carbon Tetra Chloride (per kg)	16.50
Chloroform (per kg)	27.00
Methylene Chloride (per kg)	26.00
Methanol (per kg)	11.00
Methyl Ethyl Ketone (per kg)	49.00
Cellosolve (per kg)	52.00
Butyl Acetate (per kg)	40.00
Ethyl Acetate (per kg)	23.00
Triethanolamine (per kg)	24.50
Sorbitol (per kg)	35.00

Drugs Materials Exported

MADRAS

(From 1.4.88 to 31.5.88)

ALPHA METHYLDOPA: To New York: Dr. Reddy's Labs. Ltd., 4,000 kgs., Rs. 30,86,039.

AMPICILLIN TRIHYDRATE: To Hamburg: TTK Chemicals Ltd., 500 kgs., Rs. 3,97,943.

CHLORPROPAMIDE: To Hamburg: Kothari Phyto Chemical Intl., 3,000 kgs., Rs. 3,80,000.

CIS-PLATIN: To London: Tamilnadu Dadha Pharmaceuticals Ltd., 100 grms., Rs. 25,000.

DRUGS: To Colombo: Alfred Berg & Co. India Pvt. Ltd., 897 kgs., Rs. 2,29,153; Medopharm, 3,112 kgs., Rs. 3,18,847; To Kabul: Southern Antibiotics (P) Ltd., 2 kgs., Rs. 750.

EPHEDRINE HYDROCHLORIDE: To Colombo: Medoform, 45 kgs., Rs. 4,800.

ERYTHROMYCIN ESTOLATE: To Copenhagen: Pradeep Drug Co., 750 kgs., Rs. 6,54,096.

ERYTHROMYCINE STEARATE BP (Western Drug): To Basel: Tamil Nadu Dadha Pharmaceuticals Ltd., 200 kgs., Rs. 1,60,660.

IBUPROFEN USP XXI AND BP 80: To New York: Cheminor Drugs Pvt. Ltd., 10,000 kgs., Rs. 23,60,166.

IBUPROFEN USP AND EP 80: To New York: Cheminor Drugs Pvt. Ltd., 12,000 kgs., Rs. 28,20,602.

MEBENDAZOLE USP: To Copenhagen: Pradeep Drug Co., 250 kgs., Rs. 1,26,209.

NICLOSAMIDE BP: To Hamburg: Alved Products, 200 kgs., Rs. 82,500.

OXYCLOZAMIDE BP: To London: IEL Ltd., 1,700 kgs., Rs. 14,05,500.

PHARMACEUTICALS PREPARATIONS: To Singapore: Zylus Enterprises, 956 kgs., Rs. 18,930.

PHENOBARBITONE: To Colombo: Mohan Pharma, 204 kgs., Rs. 24,876.

SULPHAMETHOXAZOLE P. 80: To Hamburg: Siris Ltd., 17 mts., Rs. 39,31,003.

SULPHAMETHOXAZOLE: To Hamburg: Siris Ltd., 17,000 kgs., Rs. 39,64,378.

TRIMETHOPRIM BP 80: To Hamburg: Inventa Chem. Pvt. Ltd., 6,000 kgs., Rs. 24,65,800; Standard Organics Ltd., 2,000 kgs., Rs. 8,30,650.

TRIMOXAZOLE & METRONIDAZOLE: To Colombo: Alfred Berg & Co. India Pvt. Ltd., 171.17 kgs., Rs. 55,588.

DYES MATERIALS IMPORTED MADRAS

(From 1.4.88 to 31.5.88)

CARBON BLACK: From Japan: Essor Electronics, 84 kgs., Rs. 13,914; From Phillippines: MRF Ltd., 50 kgs., Rs. 852.

DYESTUFFS: From France: Chemcrown India Ltd., 225 kgs., Rs. 54,506.

INDANTHRENE BRILL. PINK POWDER: From FRG: Madura Coats Ltd., 25 kgs., Rs. 41,060.

LUGANIL BROWN NT: From FRG: Noe Leather Garments Pvt. Ltd., 8 nos., Rs. 40,079.

RECLASOL BLACK BRL: From FRG: Chemcrown (India) Ltd., 400 kgs., Rs. 58,635.

RECLASOL NAVY BLUE BL: From Switzerland: Tata Exports Ltd., 50 kgs., Rs. 20,672.

SANDOCRYL BLACK: From Switzerland: MA. Khizar Hussain & Sons, 50 kgs., Rs. 12,657.

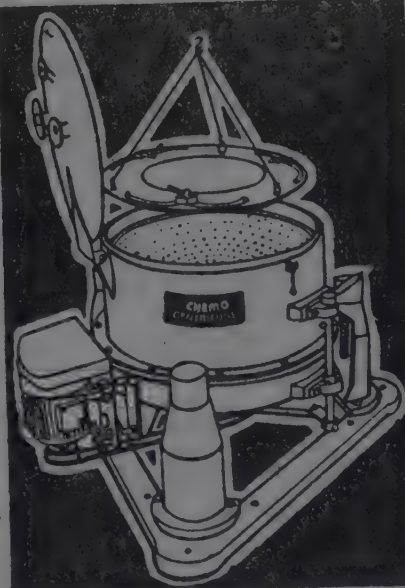
SANDOCRYL BLUE: From Switzerland: Chemcrown (India) Ltd., 100 kgs., Rs. 31,237.

SAVINYL BLUE RLSN: From FRG: Chemcrown India Ltd., 15 kgs., Rs. 5,934.

SAVINYL FIBRE RED: From FRG: Chemcrown (India) Ltd., 20 kgs., Rs. 15,730.

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Agent For South India :

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3, Krishnappa Maistry Street.

Woods Road, Madras-600 002.

Phone : 84 97 27

MATERIALS IMPORTED

MADRAS

(From 1.6.88 to 31.6.88)

ACETAL COPOLYMER: From Japan: BPL Sanyo Technologies Ltd., 275 kgs., Rs. 49,025.

ACETO NITRILE: From Taiwan: Harm Chem Pvt. Ltd., 3,000 kgs., Rs. 42,261.

ACETONITRILE 99.5% PURITY: From Taiwan: Lyka Labs. Ltd., 12 mts., Rs. 1,66,195; Satyam Pharma Chem. Ltd., 1,000 kgs., Rs. 1,26,783.

ACETYL SULPHANILYL CHLORIDE: From Japan: Benzex Labs. Ltd., 340 mts., Rs. 11,88,423.

ACETYLENE BLACK: From Japan: M. R. Electronic Components Ltd., 240 kgs., Rs. 30,542.

ALDEHYDE: From FRG: The Mysore State Agar Manufacturers' Co-op. Soc. Ltd., 250 kgs., Rs. 86,205.

ALDEHYDE C: From Switzerland: The Mysore State Agar Mfg. Co. Soc. Ltd., 470 kgs., Rs. 1,45,365.

ALDEHYDE C-19: From France: Florale Pvt. Ltd., 25 kgs., Rs. 3,955.

ALLYL CAPROATE: From UK: Bush Boake Allen (I) Ltd., 159 kgs., Rs. 28,713; Robin Chemicals Ltd., 10 kgs., Rs. 3,695.

ALLYL CHLORIDE: From Japan: Pohomal Kewalram Sons, 2,160 kgs., Rs. 45,585.

ALPHA OLEFIN SULPHONATE: From France: Chemicals & Plastics India Ltd., 36,000 kgs., Rs. 3,30,099.

ALUMINIUM OXIDE: From FRG: Bengal Lamps Ltd., 300 kgs., Rs. 48,403.

AMMONIUM ADIPATE: From Japan: Keltron Component Complex Ltd., 600 kgs., Rs. 36,750.

AMMONIUM CUMANE SULPHONATE: From FRG: Unipon (Tanning Proc.) Pvt. Ltd., 1,040 kgs., Rs. 18,260.

AMMONIUM PENTABORATE: From Japan: Keltron Component Complex Ltd., 2,500 kgs., Rs. 1,20,162.

AROMATIC CHEMICALS: From Belgium: N. Ranga Rao & Sons, 75 kgs., Rs. 41,464; From France: Muddanta & Sons, 75 kgs., Rs. 9,599; The Mysore Agarbathi Manu. Co-op. Soc. Ltd., 2,000 kgs., Rs. 3,08,647; From FRG: The Chemical Engg. Corpn., 315 kgs., Rs. 51,289; Maschmeijer Aromatics India Ltd., 660 kgs., Rs. 1,97,836; Vasu Agarbatthies, 210 kgs., Rs. 71,535; From Japan: B. V. Aswathiah & Bros., 200 kgs., Rs. 62,322; From Japan: The Mysore State Agarbathi Manufacturers Co-op. Soc. Ltd., 565 kgs., Rs. 1,75,283; Rangasugandh Agarbatthies, 200 kgs., Rs. 29,636; B. V. Aswathiah & Bros., 770 kgs., Rs. 1,61,183; From Switzerland: Enpi Aromatic & Chemicals Pvt. Ltd., 54 kgs., Rs. 24,900; Maschmeijer Aromatics (India), 10 kgs., Rs. 63,159; The Mysore State Agarbatthies Manufacturers Co-op. Soc. Ltd., 1,550 kgs., Rs. 5,00,092; Bush Boake Allen India Ltd., 55 kgs., Rs. 1,15,435; From UK: Bush Boake Allen (I) Ltd., 20 kgs., Rs. 12,253; N. Ranga Rao & Sons, 630 kgs., Rs. 1,90,938; From USA: Metro Agarbathi Co., 2,000 kgs., Rs. 4,22,082.

BETA HYDROXY ETHYL HYDRAZINE: From Netherlands: Es-kayef Ltd., 5,000 kgs., Rs. 5,14,412.

BIO CHEMICALS: From National Inst. of Nutrition 1 Rs. 39,109.

BISPHENOL A: From Bra SIP Resins Ltd., 1,28,800 k Rs. 24,37,968.

BUTYL ACRYLATE: From pan: Akash Enterprises, 4 m's., Rs. 7,12,260.

BUTYL ALCOHOL: From S gapore: Peacock Polymers L 1002 kgs., Rs. 19,785.

CALCIUM CARBIDE: From land: Indl. Oxygen Co. Pvt. Lt 100 MT, Rs. 3,78,608.

CARBOFURAN: From US Rallis India Ltd., 9,000 kgs., P 14,94,563.

CARBON BLACK: From Au tralia: Vikrant Tyres., 10,25 kgs., Rs. 69,601; From FR Shriram Fibres Ltd., 300 kgs Rs. 20,089.

CELLULOSE ACETATE: From FRG: Kothari Electronics Ltd 700 kgs., Rs. 1,25,596.

CHEMICALS: From FRG: Cut fast Abrasive Tools Ltd., 2 kgs. Rs. 100.

CHLORO TRIFLUORO DIBRO MOETHANE: From UK: I.E.L Ltd., 14,000 kgs., Rs. 6,32,028.

CINNAMIC ALCOHOL: From FRG: The Mysore State Agarba thi Manu. Co-op. Soc. Ltd., 3,000 kgs., Rs. 3,17,936.

CITRIC ACID: From China: Emkay Indl. Corpn., 16,000 kgs., Rs. 2,68,022.

COUMARIN: From France: Bharat Indl., Corpn., 2,000 kgs., Rs. 3,95,701; From Switzerland: TMSAM Co-op. Soc. Ltd., 3,000 kgs., Rs. 5,93,552.

CYCLOHEXANONE: From FRG: The Agrochem Industries, 14,820 Kgs., Rs. 2,46,139; Murugappa Electronics, 5,130 kgs., Rs. 89,259.

CYCLOPROPANE CARBOXYLIC ACID: From FRG: Tamil Nadu Dadha Pharm. Ltd., 20 kgs., Rs. 20,413

CYCLOHEXANONE: From Italy: K.P. Industries, 14,400 kgs., Rs. 2,36,221; From Netherlands: Agro Chemical Industries, 16,614 kgs., Rs. 2,75,935; Bangalore Pesticides Ltd., 16,614 kgs., Rs. 2,75,935.

DESMOPHEN: From Belgium: Karnataka Consumer Products Ltd., 11,395 kgs., Rs. 1,65,330.

DEXTROMETHORPHAN HYDROBROMIDE: From Switzerland: Mysore Pharms Ltd., 5 kgs., Rs. 20,642.

DIACETYL 100%: From UK: Bush Boake Allen (I) Ltd., 50 kgs., Rs. 22,459.

DIETHYL SULPHATE: From Japan: I.E.L. Ltd., 5,060 kgs., Rs. 97,662.

DIETHYLENE GLYCOL: From Japan: Meta Tex Exports, 18,860 kgs., Rs. 1,23,986.

DI ISO BUTYLENE: From Japan: Indofil Chemicals Ltd., 2520 kgs., Rs. 60,130.

DIMETHYL CARBONATE: From France: Eskayef Ltd., 32,000 kgs., Rs. 9,12,160; I.E.L. Ltd., 2,000 kgs., Rs. 89,507.

DIMETHYL LAURYL AMINE: From Japan: I.E.L. Ltd., 12,800 kgs., Rs. 4,89,614.

DIMETHYL SULFOXIDE: From USA: Inventa Chemicals P. Ltd., 15,255 Mt., Rs. 3,32,389.

DIMETHYL UREA: From FRG: Chandra Pharmaceuticals Ltd., 6,500 kgs., Rs. 1,35,359.

DI OCTYLATED DIPHENYL AMINE: From Belgium: Urethanes India Ltd., 200 kgs., Rs. 7,386.

2,6, DI TERT BUTYL PARA CRESOL: From Belgium: Urethanes India Ltd., 25 kgs., Rs. 1,824.

EPICHLOROHYDRIN: From Japan: EID Parry Ltd., 5,040 kgs., Rs. 1,22,984.

EPICHLOROHYDRIN: From Japan: I.E.L. Ltd., 2,400 kgs., Rs. 62,278; Veyor Polymers, 2,400 kgs., Rs. 57,424.

ETHANE: From Japan: Electronic Res. (P) Ltd., 40 Nos., Rs. 23,134.

3-ETHOXY CARBONYL PROPIONIC CHLORIDE: From USA: Pradeep Drug Co., 216 kgs., Rs. 78,349.

ETHYL ACETO ACETATE: From UK: Robin Chemicals Ltd., 2 kgs., Rs. 281.

ETHYL BENZENE: From UK: I.E.L. Ltd., 13,475 kgs., Rs. 1,73,401.

ETHYL BUTYRATE: From Switzerland: Enpi Aromatic & Chemicals Pvt. Ltd., 105 kgs., Rs. 21,797.

ETHYL CELLULOSE: From USA: Eskayef Ltd., 90.72 kgs., Rs. 27,138.

ETHYL CYANO ACRYLATE: From FRG: Darien Electric, 48 kgs., Rs. 3,420; From Japan: Dr. Reddy's Labs Ltd., 800 kgs., Rs. 1,06,601.

ETHYL GLYCOL: From FRG: M.A. Khizar Hussain & Sons., 7,252 kgs., Rs. 1,17,807.

2-ETHYL HEXANOL: From FRG: Curekraft India Pvt. Ltd., 16,000 kgs., Rs. 2,37,930.

2-ETHYL HEXANOIC ACID: From FRG: TTK Chemicals Pvt. Ltd., 1140 kgs., Rs. 22,090.

ETHYL ISO VALERATE: From UK: Bush Boake Allen (I) Ltd., 100 kgs., Rs. 20,348.

ETHYL MERCAPTAN: From Belgium: Hindustan Petroleum Corpn., 320 kgs., Rs. 8,577.

ETHYL VANILLIN: From France: Bush Boake I Ltd., 800 kgs., Rs. 2,42,697.

ETHYLENE GLYCOL: From GDR: Keltron Component Complex Ltd., 14,520 kgs., Rs. 2,64,124; From Japan: Electronics Corpn., of Tamil Nadu, 2,475 kgs., Rs. 67,717.

EUGENOL: From Switzerland: Enpi Aromatic & Chemicals Pvt. Ltd., 120 kgs., Rs. 45,115.

FORMIC ACID 85%: From GDR: Bokadiya Bros. 10,080 kgs., Rs. 78,442.

FURFURYL ALCOHOL: From Belgium: Coromandel Prodorite Ltd., NA. Rs. 2,69,076.

GALLIC ACID MONOHYDRATE: From China: Inventa Chemicals Pvt. Ltd., 20 MT, Rs. 16,77,773.

GAMMA PICOLINE: From Sweden: Mansons Drugs Ltd., 900 kgs., Rs. 40,362.

GUM BENZOIN: From Indonesia: MSR Natarajan & Bros., 50 kgs., Rs. 7,585; From Singapore: A.S.A. Narayan, 1,142 kgs., Rs. 24,651; C. Palaniappan & Sons, 1,582 kgs., Rs. 27,544; S.P.K. Company, 1,347 kgs., Rs. 18,301; S.P.K.M. Rajamani, 725 kgs., Rs. 12,404; S.P.K. Muniswaran, 1294 kgs., Rs. 17,584; Damodar & Co., 250 kgs., Rs. 14,267; Shah Kantilal Jayantilal, 1,383 kgs., Rs. 20,885; Shah Shantilal Indermall, 1,409 kgs., Rs. 18,434; Shah Shantilal Indermall, 555 kgs., Rs. 11,171.

GUM ROSIN: From China: A. P. Paper Mill Ltd., 99.9 MT, Rs. 6,85,196; Bhadrachalam Paper Boards Ltd., 99.9 MT, Rs. 6,80,443; Delta Paper Mills Ltd., 18 MT, Rs. 1,22,447; From Hong Kong: Bhadrachalam Paper Boards Ltd., 8,100 kgs., Rs. 55,171; Rajalakshmi Paper Mills (P) Ltd., 18,560 kgs., Rs. 1,35,075; From Indonesia: A. S. Manikam Firm, 9.84 MT., Rs. 68,033.

HELIOTROPIN: From Japan: Mysore State Agarbathi Mfg. Ltd., 750 kgs., Rs. 2,23,077; From USA: N. Ranga Rao & Sons, 1,500 kgs., Rs. 4,34,666.

HEXYL CINNAMIC ALDEHYDE: From FRG: Sovas Chemicals Ltd., 100 kgs., Rs. 14,443; From UK: Bush Boake Allen (I) Ltd., 50 kgs., Rs. 6,031.

HYDROGEN CHLORIDE 99.

6%: From UK: I.E.L. Ltd., 522 kgs., Rs. 15,548.

HYDROGEN PEROXIDE: From UK: I.T.I. Ltd., 350 kgs., Rs. 24,272.

HYDROXYLAMINE SULPHATE: From Japan: Standard Organics Ltd., 17,500 kgs., Rs. 4,82,521.

HYDROXY PROPYL METHYL CELLULOSE: From Japan: Asha Indl. Ltd., 360 kgs., Rs. 68,147.

INSOLUBLE SULPHUR 90%: From FRG: M.R.F. Ltd., 40,500 kgs., Rs. 10,98,786.

ISO AMYL ACETATE: From Switzerland: Enpi Aromatic & Chemicals Ltd., 924 kgs., Rs. 85,301.

ISOAMYL ISOVALERATE: From France: Florale Pvt. Ltd., 360 kgs., Rs. 49,424; From Switzerland: Enpi Aromatic & Chemicals Pvt. Ltd., 30 kgs., Rs. 12,183.

ISO BUTANOL: From FRG: Addisons Paints & Chemicals Ltd., 25.8 MT, Rs. 3,02,979.

ISOBUTYL BENZENE: From USA: Chandra Pharmaceuticals Ltd., 27,314 kgs., Rs. 10,37,586; Cheminor Drugs Pvt. Ltd., 54,628 kgs., Rs. 21,47,226; Shasun Drugs, 13.657 MT, Rs. 5,45,813.

ISONONYL ACETATE: From France: Florale Pvt. Ltd., 50 kgs., Rs. 2,095.

ISO PROPYL ACID PHOSPHATE: From Japan: Coromandel Indag Products Pvt. Ltd., 5,000 kgs., Rs. 2,11,291.

ISO PROPYL ALCOHOL: From Thailand: Chandra Pharmaceuticals Ltd., 51.2 MT, Rs. 4,55,848.

LABORATORY CHEMICALS: From Italy: Shifa Hospital & Res. Centre, 4 kgs., Rs. 265; From Switzerland: ICMR (I), 3 Nos., Rs. 4561; From UK: TB Research Centre, 7 kgs., Rs. 51,404.

LAURIC ACID: From Singapore: Prakash Pipes & Inds. Ltd., 550 kgs., Rs. 7,133.

LAURYL PEROXIDE: From GDR: Chemicals & Plastics (I) Ltd., 3,000 kgs., Rs. 2,01,676.

LINALOOL From France: Reliable Industrial Syndicate, 1,000 kgs., Rs. 1,21,001; The Mysore State Agarbathies Mfrs. Co-op. Soc. Ltd., 10,650 kgs., Rs. 12,88,657; From USA: Bharat Indl. Corpn., 3,175 kgs., Rs. 176,905.

LINALOOL SPECIAL: From USA: Padmini Products, 1,600 Lbs., Rs. 1,33,100; Vinaram Pvt. Ltd., 544 kgs., Rs. 50,586.

LINALYL ACETATE: From France: The Mysore State Agar. Mfrs., Co-op. Soc. Ltd., 350 kgs., Rs. 52,938; From USA: Vinaron Pvt. Ltd., 363 kgs., Rs. 38,687.

MAGNESIUM OXIDE: From USA: Sundaram Abex Ltd., 200 Lbs., Rs. 838.

2-MERCAPTOBENZIMIDAZOLE: From Japan: Shriram Fibres Ltd., 1,750 kgs., Rs. 2,69,098.

METACRESOL 97%: From Japan: Maschmeijer Aromatics India Ltd., 16,000 kgs., Rs. 5,90,914.

METHANOL: From Saudi Arabia: S.T.C. of India, 3055.392 MT, Rs. 80,69,319.

METHIONINE HYDROXY ANALOG: From USA: Tetragon Chemie Pvt. Ltd., 6.010 MT, Rs. 1,94,962.

METHOXY POLYETHYLENE GLYCOL: From Belgium: Urethanes I Ltd., 270 kgs., Rs. 3,618.

METHYL ACETO ACETATE: From Japan: SIRIS LTD., 16 MT, Rs. 3,03,054; From USA: Saver Labs., Pvt. Ltd., 25.256 MT, Rs. 4,87,289; Shasun Drugs, 33.852 MT, Rs. 6,01,096; Vani Chemicals Intermediates Pvt. Ltd., 20.29 MT, Rs. 3,87,744.

METHYL ETHYL KETONE: From France: Murugappa Electronics Ltd., 13,600 kgs., Rs. 1,70,416; From Japan: Bhor Inds., 11.55 MT, Rs. 1,82,814; From Netherlands: M.P. Oil Extrachem

Pvt. Ltd., 13.2 MT, Rs. 1,26,228; From Singapore: American Dry Fruit Stores, 13,200 kgs., Rs. 1,39,287; Libbas Impex Pvt. Ltd., 39.6 MT, Rs. 3,78,684.

METHYL VINYL DICHLORO SILANE: From USA: Vikram Sarabhai Space Centre, 182 Nos., Rs. 56,318.

MONO SODIUM GLUTAMATE: From Thailand: Rajendra Enterprises, 1000 kgs., Rs. 28,405; From Singapore: Chandras Industries, 5 MT, Rs. 89,033.

MORPHOLINE: From USA: Inventaa Chemicals Pvt. Ltd., 15,023 kgs., Rs. 3,61,830.

N-N ETHYLENE BIS OLEAMIDE BP: From Belgium: Urethanes I Ltd., 182 kgs., Rs. 11,834.

NEO PENTYL GLYCOL: From Japan: Vijayalakshmi Drugs & Chemicals, 1,50,000 kgs., Rs. 3,31,994.

5 NITRO FURFURALDEHYDE DIACETATE: From Netherlands: Eskayef Ltd., 13,000 kgs., Rs. 5,65,853.

ORTHO PHENITIDINE: From FRG: Vanavil Dyes & Chemicals Ltd., 2,160 kgs., Rs. 2,88,705.

ORTHOXYLENE: From Netherlands: Thirumalai Chemicals Ltd., 31,42,492 kgs., Rs. 1,61,03,167.

PARACHLOROANILINE FLAKES: From FRG: I.E.L. Ltd., 2,000 kgs., Rs. 1,55,013.

PARAFFIN WAX (REFINED): From Singapore: 79,500 kgs., Rs. 5,07,193.

PENTA ERYTHRITOL: From Japan: IDL Chemicals Ltd., 17,500 kgs., Rs. 4,31,361.

PHENYL ACETALDEHYDE: From FRG: The Mysore State Agarbathi Mfrs. Co-op. Soc. Ltd., 200 kgs., Rs. 34,799.

PHOSPHORIC ACID: From USA: Madras Fertilizers Ltd., 6,583.9 MT, Rs. 3,34,56,292.

PHOSPHOROUS PENTACHLORIDE: From FRG: Escorts Ltd., 3,045 kgs., Rs. 2,41,208.

PIVALOYL CHLORIDE: From France: TTK Chemicals Ltd., 19-80 kgs., Rs. 1,29,006.

POLYACRYLIC ACID: From UK: Chemicals & Plastics India Ltd., 5,000 kgs., Rs. 1,04,282.

POLYBUTYL TEREPHTHALATE: From Korea: Suchitra Electronics Pvt. Ltd., 1,000 kgs., Rs. 72,627.

POLYCARBADIIMIDE: From Belgium: Urethanes India Ltd., 35 kgs., Rs. 18,686.

POLYESTER MOULDING POWDER: From Japan: BPL Sanyo Technologies Ltd., 175 kgs., Rs. 30,982.

POLYTETRAMETHYLENE ETHER GLYCOL: From USA: Urethane India Ltd., 28,086 kgs., Rs. 2,96,650.

POLYVINYL ACETATE: From Japan: Electronics Res. Pvt. Ltd., 90 kgs., Rs. 14,705.

POLYVINYL ALCOHOL: From Japan: Mansoor Leather, 8.16 MT., Rs. 2,04,498.

POTASSIUM BROMIDE: From UK: Hindustan Photo Films Mfg. Co., 17,500 kgs., Rs. 4,31,361.

POTASSIUM CHLORIDE: From FRG: Standard Alkali, 16,000 kgs., Rs. 70,19,936.

POTASSIUM CYANIDE: From UK: HMT Ltd., 60 kgs., Rs. 16,500.

PROPYLENE GLYCOL ALGINATE: From Japan: Biocon I. Pvt. Ltd., 300 kgs., Rs. 51,381.

SILANE: From Italy: Ceat Tyres of India Ltd., 211 kgs., Rs. 50,063.

SODIUM: From FRG: Plant Organics Ltd., 8,960 kgs., Rs. 2,39,250.

SODIUM FORMATE: From Sweden: Tamilnadu Chemical

Products Ltd., 180 MT. Rs. 8,54,715.

SODIUM GLUTAMATE: From Thailand: Bhagyalakshmi Ayurvedic Pharm. 1,008 kgs., Rs. 16,231.

SODIUM LIGNOSULPHONATE: From Norway: Chemicals & Plastics I. Ltd., 500 kgs., Rs. 3378.

SODIUM METAL: From Belgium: Hilversons Electronics, 2,000 kgs., Rs. 73,601; From FRG: Chandra Pharmaceuticals Ltd., 14.4 MT, Rs. 4,59,994; From France: Dakshin Pharmaceuticals Ltd., 7,992 kgs., Rs. 2,44,563; From Japan: Hitech Chemical & Drugs Pvt. Ltd., 8,450 kgs., Rs. 2,55,185; Samyuk Resins & Chemicals Pvt. Ltd., 8,450 kgs., Rs. 2,55,185; Samyuk Resins & Chemicals Pvt. Ltd., 8.41 Rs. 2,53,593.

SODIUM METHOXIDE: From FRG: I.E.L. Ltd., 1,000 kgs., Rs. 50,221.

SODIUM NITRATE: From USA: Ion Exchange India Ltd., 2 kgs., Rs. 549.

SODIUM POLYSTYRENE SULPHONATE: From USA: Christian Medical College & Hospital, 12 BTL, Rs. 5,806.

SODIUM SALT: From Singapore: Pond's India Ltd., 4,200 kgs., Rs. 73,680.

STANNOUS OCTATE: From Belgium: Urethanes India Ltd., 25 kgs., Rs. 3,871.

STANNOUS OCTOATE CATALYST: From FRG: Swastik Co. Pvt. Ltd., 50 kgs., Rs. 13,346.

STEARIC ACID: From Japan: Murugappa Electronics Ltd., 240 kgs., Rs. 2,81,002.

STYRENE ACRYLONITRILE: From Japan: BPL Sanyo Tech. Ltd., 1,000 kgs., Rs. 58,961.

STYRENE MONOMER: From Japan: Amar Preet Enterprises P. Ltd., 16 MT, Rs. 2,00,489; Emkay Indl. Corpn. 14,440 kgs., Rs. 1,80,941.

SULPHUR CHLORIDE: From Japan: R. I. Kannapiran Mills Ltd., 1 Pcs. Rs. 12.

TERTIARY BUTYL META XYLENE: From FRG: Maschmeijer Aromatics (I) Ltd., 14,040 kgs., Rs. 4,90,749.

THYMOL: From Japan: DCW Ltd., 50 kgs., Rs. 31,815.

TIN OXIDE: From UK: Gem Granites, 1000 kgs., Rs. 1,83,798.

TOLUENE DI-ISO CYANATE: From Belgium: Joy Foam Pvt. Ltd., 19,000 kgs., Rs. 5,31,295; Karnataka Consumer Products Ltd., 4,750 kgs., Rs. 1,32,823.

TRICALCIUM PHOSPHATE: From FRG: McDowell & Co. Ltd., 1,000 kgs., Rs. 26,108.

TRIMETHOXYBENZALDEHYDE: From Netherlands: Dakshin Pharms. Ltd., 1,000 kgs., Rs. 3,28,168.

TRIPHENYL PHOSPHATE: From FRG: Hindustan Photo Films Mfg., 30,000 kgs., Rs. 12,22,006.

VANILLIN: From France: Aravinda Parimala Works, 5,000 kgs., Rs. 8,75,918; Bush Boake Allen (I) Ltd., 500 kgs., Rs. 93,649; From Switzerland: The Mysore State Agarbathi Mfrs. Co-op. Soc. Ltd., 5,000 kgs., Rs. 8,77,133.

VANILLIN CRYSTALLISED: From USA: The Chemical Engg. Corpn. Pvt. Ltd., 500 kgs., Rs. 93,650.

VANILLIN TECH: From France: Dr. Reddy's Labs. Ltd., 42,000 kgs., Rs. 64,81,526.

Plastics Materials Imported

MADRAS

(From 1.6.88 to 31.6.88)

CAPROLACTAM: From FRG: Shriram Fibres Ltd., 238 MTs., Rs. 59,33,143.

EPOXY RESIN: From Japan: Al Ameen Comm. & Indl. 185 kgs., Rs. 20,470; Electronic Research (P) Ltd., 2,676 kgs., Rs. 2,58,094; Electronics Consortium P. Ltd., 7,000 kgs., Rs. 5,56,754; Keltron Resistors Ltd., 500 kgs., Rs. 51,715; Kothari Electronics & Inds. Ltd., 350 kgs., Rs. 42,409; From Singapore: V. V. Rama Rao & Co., 5,200 kgs., Rs. 2,98,247.

HDPE: From FRG: Polyspin P. Ltd., 2,500 kgs., Rs. 4,34,685; Premier Fibres P. Ltd., 12.5 MTs., Rs. 2,18,482; Sandoor Polysacks, 12.5 MTs., Rs. 2,18,482; Sri Narasimha Plastic Inds., 12,500 kgs., Rs. 2,18,482; From Japan: SPIC, 50,000 kgs., Rs. 10,20,390; From Portugal: Decan Polysack Ltd., 16,500 kgs., Rs. 3,10,502; From Saudi Arabia: Earnest Deco Pack Inds., 59,050 kgs., Rs. 10,31,899; Himoll Ind., 17 MTs., Rs. 2,89,548; Kwaliti Polymers, 17.15 MTs., Rs. 2,96,334; Polyack Plastic Co., 17,150 kgs., Rs. 2,78,238; From UAE: Sunshine Plastic Industries, 17,150 kgs., Rs. 2,82,762; From USA: Kabini Polybags (P) Ltd., 17,000 kgs., Rs. 3,05,492; From Yugoslavia: Kakmur Plastics, 16,000 kgs., Rs. 1,54,609.

HDPE GRANULES: From FRG: Plasweave P. Ltd., 12.5 MTs., Rs. 2,09,584; From Japan: Associated Polysacks P. Ltd., 15 MTs., Rs. 3,04,290; Dalmia Laminators Ltd., 10,000 kgs., Rs. 2,02,150; Sri Jayashakti Polymers (P) Ltd., 10,000 kgs., Rs.

2,03,411; Sumitra Plastics Ltd., 50,000 kgs., Rs. 9,30,244; From Netherlands: Magnum Packaging Inds., 16.5 MTs., Rs. 3,12,607; From Portugal: Amman Polysacks P. Ltd., 33 MTs., Rs. 6,25,039; Sun Polysacks (P) Ltd., 16.5 MTs., Rs. 3,12,559; From Saudi Arabia: Earnest Decopack Inds P. Ltd., 17,150 kgs., Rs. 2,89,548; From Singapore: Gem Properties P. Ltd., 48,000 kgs., Rs. 9,05,364; Peacock Polymers Ltd., 12 MTs., Rs. 2,55,228; Polyspin P. Ltd., 50,400 kgs., Rs. 9,58,548; From USA: Bee Jay Pee Sacks P. Ltd., 85,000 kgs., Rs. 15,75,220; Espar Pak. P. Ltd., 17 MTs., Rs. 3,07,195; Vijay Packagings Systems Ltd., 33 MTs., Rs. 5,97,091.

LDPE: From Singapore: Multi Poly Films (P) Ltd., 16.5 MTs., Rs. 2,85,702.

PHENOLIC RESIN: From Japan: Al Ameen Comm. & Inds., 20 kgs., Rs. 2,213.

POLYACETAL RESIN: From USA: Murugappa Electronic Ltd., 4,000 kgs., Rs. 1,23,987.

POLYCARBONATE MOULDING POWDER: From FRG: Asla Ltd., 1,800 kgs., Rs. 85,472.

POLYPROPYLENE: From Singapore: Chokkar Polybags., 16.5 MTs., Rs. 3,09,043; MM Naina & Co., 16 MTs., Rs. 2,95,457; N. Plastics P. Ltd., 16.5 MTs., Rs. 3,15,572; VPS Ayyamperumal Nadar & Sons, 16,000 kgs., Rs. 2,95,457.

POLYSTYRENE RESIN: From Korea: Beardsell Insulations, 34 MTs., Rs. 8,56,150.

POLYURETHANE: From Japan: Amco Batteries Ltd., 120 kgs., Rs. 16,544.

PVC RESIN: From Korea: Fenner India Ltd., 35,000 kgs., Rs. 6,34,910; From Yugoslavia: Aqua Vinpipes P. Ltd., 50 MTs., Rs. 6,79,288; Lotus Roofing P. Ltd., 100 kgs., Rs. 13,79,408; United Indl. Plastics P. Ltd., 50 MTs., Rs. 7,79,335.

DRUGS MATERIALS IMPORTED

MADRAS

(From 1.6.88 to 31.6.88)

6-AMINO PENICILLIN ACID: From Austria: TTK Chemicals Ltd., 1,860 kgs., Rs. 14,13,892.

AMPICILLIN SODIUM STERILE: From Italy: T. N. Dadha Pharm. Ltd., 150 kgs., Rs. 2,33,399; From Spain: Armour Pharms. P. Ltd., 50 kgs., Rs. 79,371.

AMOXYCILLIN TRIHYDRATE POWDER: From Korea: Alfred Berg. & Co. P. Ltd., 135 kgs., Rs. 1,38,008.

CALCIUM D PANTOTHENATE: From Japan: Remeidex Pharma P. Ltd., 250 kgs., Rs. 49,463.

CALCIUM D PANTOTHENATE BP/USP: From Japan: Remeidex Pharma P. Ltd., 250 kgs., Rs. 49,463.

CLOTRIMAZOLE: From Italy: Fourts Labs., 250 kgs., Rs. 25,393.

CLOXACILLIN SODIUM: From Singapore: TTK Chemicals Ltd., 200 kgs., Rs. 2,26,779.

DOPAMINE HCL USP: From FRG: TTK Pharma Ltd., 12 kgs., Rs. 33,949.

ERYTHROMYCIN THIOCYANATE: From USA: Pradeep Drug Co., 999.25 kgs., Rs. 11,32,833; From Italy: Pradeep Drug Co., 1,000 kgs., Rs. 11,14,024.

ETHISTERONE TECH: From FRG: Tamilnadu Dadha Pharm. Ltd., 50 kgs., Rs. 2,14,941.

FURALTADONE HCL MONOHYDRATE: From Italy: Eskayef Ltd., 500 kgs., Rs. 1,01,352.

LACTOSE BP/USP: From Netherlands: Tamilnadu Dadha Pharms., 18,000 kgs., Rs. 2,04,913.

OXETHIAZINE: From Hong Kong: Tamilnadu Dadha Pharm. Ltd., 50 kgs., Rs. 1,40,891.

PREDNISOLONE UP: From Netherlands: Medopharm., 50 kgs., Rs. 5,50,459.

PROCHLORPHENAZINE MAL-EATE: From Italy: Medopharm, 25 kgs., Rs. 43,450.

PROPYLENE GLYCOL USP: From Singapore: Bush Boake Allen India Ltd., 33,540 kgs., Rs. 3,70,726.

SALBUTAMOL SULPHATE BP/USP: From Finland: Tablets (India) Ltd., 25 kgs., Rs. 1,07,798.

SULPHADIAZINE BP: From China: Kanpha Labs., 500 kgs., Rs. 1,16,666.

TRIFLUOPERAZINE HCL BP: From Italy: Eskayef Ltd., 500 kgs., Rs. 8,65,007.

VANILLIN USP: From France: Dr. Reddy's Labs., 9,000 kgs., Rs. 15,78,843.

DYE MATERIALS IMPORTED MADRAS

(From 1.6.88 to 31.6.88)

ANILINE DYES: From UK: Shafeer Shameel & Co., 500 kgs., Rs. 73,204.

CHROMANIL BROWN RED: From Italy: M. A. Khizar Hussain Sons, 5,325 kgs., Rs. 4,48,142.

DYES: From USA: Univ. of Hyderabad, 401 gms., Rs. 3,429.

DYESTUFFS: From FRG: Chika Ltd., 0.92 kgs., Rs. 229; From Spain: A. S. Nisar Ahmed & Co., 200 kgs., Rs. 45,532; From Switzerland: Leather Mfrs., 500 kgs., Rs. 81,316.

LUGANIL BLACK: From FRG: V.A.S. Noorullah, Na Rs. 23,130.

LUGANIL BROWN: From FRG: Tata Exports Ltd., 1,000 kgs., Rs. 2,00,144; Wasan & Co., 600 kgs., Rs. 1,12,068.

SANDOCRYL BLACK: From FRG: Chemcrown India Ltd., 270 kgs., Rs. 63,273.

SANDOCRYL BLUE: From FRG: Chemcrown India Ltd., 100 kgs., Rs. 22,960.

SAVINYL BLACK: From FRG: Farida Prime Tannery, 300 kgs., Rs. 1,70,332.

SAVINYL BLUE: From France: Tata Exports Ltd., 25 kgs., Rs. 21,824.

MATERIALS EXPORTED MADRAS

(From 1.6.88 to 30.6.88)

ALUMINIUM HYDROXIDE: To Colombo: Medopharm, 4,435 kgs., Rs. 84,941.

BARIUM CARBONATE POWDER: To Port Keelung: Kores (I) Ltd., 3,600 kgs., Rs. 1,56,000.

BARIUM CARBONATE: To Port Keelung: Travancore Chemicals & Mfg. Co. Ltd., 40,000 kgs., Rs. 1,67,496.

MICROCRYSTALLINE CELLULOSE: To Hamburg: Maruti Labs. Pvt. Ltd., 1,000 kgs., Rs. 28,700.

MUSK XYLOL: To Antwerp: Proctor & Gamble India Ltd., 12,000 kgs., Rs. 9,62,300.

PHENOL 99%: To Singapore: Hindustan Organic Chemicals Ltd., 84,800 kgs., Rs. 1,00,581.

PHTHALIC ANHYDRIDE: To Kaoshing: Thirumalai Chemicals Ltd., 5,00,000 kgs., Rs. 45,55,046.

PHTHALIC ANHYDRIDE 99.6% PURITY: To Bangkok: Thirumalai Chemicals Ltd., 1,908 MTs., Rs. 1,62,12,974.

SODIUM HYDROSULPHITE: To Genoa: Tamilnadu Chemical Products Ltd., 16,500 kgs., Rs. 2,39,187.

STRYCHNINE SULPHATE: To Hamburg: Kothari Phytochemicals, 100 kgs., 50,720.

SYNTHETIC RESIN: To Busan: Satya Cashew Chem P. Ltd., 15,000 kgs., Rs. 2,04,456.

DRUGS MATERIALS EXPORTED MADRAS

(From 1.6.88 to 30.6.88)

AMPICILLIN TRIHYDRATE: To Hongkong: TTK Chemicals, 1,000 kgs., Rs. 7,90,910.

CHLORPROPAMIDE BP 80: To Bangkok: Kothari Phytochemical, 500 kgs., Rs. 85,619.

ERYTHROMYCIN ESTOLATE BP 80: To Copenhagen: Pradeep Drug Co., 750 kgs., Rs. 6,66,271.

'L' CYSTINE: To Hamburg: Srinivasa Cystine Ltd., 7,000 kgs., Rs. 17,11,355.

MONO PENTAERYTHRITOL NITRATION GRADE: To Rotterdam: Pentasia Chem. Ltd., 12,500 kgs., Rs. 2,01,400.

SULPHADIAZINE: To China: Kanpha Labs., 850 kgs., Rs. 2,07,413.

SULPHAMETHOXAZOLE BP: To Barcelona: Inventaa Chemicals Ltd., 2,000 kgs., Rs. 4,63,122.

SULPHAMETHOXAZOLE: To Hamburg: Standard Organics Ltd., 8,500 kgs., Rs. 19,79,568.

DYES MATERIALS EXPORTED MADRAS

(From 1.4.88 to 31.5.88)

PIGMENT: To Odessa: Usha Intercontinental, 10,000 kgs., Rs. 11,50,000.

ULTRAMARINE BLUE: To Colombo: Ultramarine & Pigments Ltd., 17,000 kgs., Rs. 2,48,867; To Dakar: Afrique Bran Ultramarine and Pigments Ltd., 10,500 kgs., Rs. 2,76,000; Ultramarine & Pigments Ltd., 10,500 kgs., Rs. 2,76,000; To Odessa: Ultramarine & Pigments Ltd., 28,224 kgs., Rs. 7,96,320.

DYES MATERIALS EXPORTED MADRAS

(From 1.6.88 to 30.6.88)

ULTRAMARINE BLUE: To Dakar: Ultramarine & Pigments Ltd., 21,000 kgs., Rs. 5,52,000; To Japan: Ultramarine & Pigments Ltd., 4,000 kgs., Rs. 1,03,145; To Odessa: Ultramarine & Pigments Ltd., 53,760 kgs., Rs. 13,03,008.

YELLOW OCHRE: To Tilbury: Kalpana Agencies, 63,000 kgs., Rs. 61,860.

MATERIALS IMPORTED

BOMBAY

(From 27.6.88 to 30.6.88)

ACETOPHENONE: From FRG: Synromatic P. Ltd., 15,200 kgs., Rs. 1,92,278.

ACRYLIC ACID: From Japan: PDI Chemicals P. Ltd., 8,000 kgs., Rs. 1,79,735; Asian Paints Ltd., 2,400 kgs., Rs. 55,545.

ALUMINIUM OXIDE: From FRG: Mukul Enterprises, 1,08,000 kgs., Rs. 13,25,386.

AMMONIUM PERSULPHATE: From FRG: SD Fine Chem. P. Ltd., 53 kgs., Rs. 35,104.

ARSENIC TRIOXIDE: From China: Laxmi Chemical Works, 17,000 kgs., Rs. 1,25,706.

T-BUTANOL: From FRG: Southern Seafoods P. Ltd., 3,100 kgs., Rs. 68,724.

1,4-BUTANEDIOL: From FRG: Kaso Chemie (I) Ltd., 460 kgs., Rs. 22,085; From USA: Excel Industries, 65,500 kgs., Rs. 40,92,828.

BUTYL ACRYLATE MONOMER: From Japan: SRSK Chemicals, 14,400 kgs., Rs. 3,13,737.

N-BUTYL METHACRYLATE: From Japan: Shrinathjee Industries, 3,060 kgs., Rs. 94,210.

CAPROLACTUM: From Italy: Baroda Rayon Corporation, 213 MTs., Rs. 53,20,709.

CARBOXIN TECHNICAL: From USA: Mauhes Agrochemical, 1,102 kgs., Rs. 11,63,811.

CAUSTIC POTASH FLAKES: From France: Ravi Chem Dye, 12,000 kgs., Rs. 1,11,767.

2-CHLOROPROPIONIC ACID: From UK: Suneeta Laboratories P. Ltd., 7,800 kgs., Rs. 1,46,980.

COPPER CHROMITE BLACK: From UK: IEL Limited, 2,000 kgs., Rs. 2,94,107.

CRESYL DIPHENYL PHOSPHATE: From UK: Bakelite Hy-lam Ltd., 25,760 kgs., Rs. 9,14,598.

CYCLOHEXANONE: From FRG: Resins & Allied Chemicals, 14,820 kgs., Rs. 2,46,408; From Italy: Devidayal Sales P. Ltd., 28,880 kgs., Rs. 4,74,464; From Netherlands: New Chemi Industries P. Ltd., 33,228 kgs., Rs. 5,52,212.

2-CYANOPYRAZINE: From Japan: Armour Chemicals P. Ltd., 3,000 kgs., Rs. 15,16,187.

DL 2-AMINO BUTANOL: From FRG: Themis Chemicals Ltd., 10,140 kgs., Rs. 11,24,700.

DL-METHIONINE: From USSR: Seva Enterprises, 1,000 kgs., Rs. 78,758.

DICHLORO ACETYLCHLORIDE: From Japan: Camlin P. Ltd., 3,000 kgs., Rs. 1,04,784; Nitson Laboratories, 5,000 kgs., Rs. 1,76,764.

3,4 DICHLORO NITROBENZENE: From FRG: Sudarshan Chemical Inds., 7,000 kgs., Rs. 2,90,968.

3,3-DIETHYL-2, 4-DIOXOTETRAHYDROPYRIDINE: From Switzerland: Roche Products Ltd., 800 kgs., Rs. 5,20,989.

EPICHLORO HYDRIN: From Japan: Sandoz (I) Ltd., 5,040 kgs., Rs. 1,23,118.

N-ETHYL ANILINE: From Japan: Jaysynth Dyechem P. Ltd., 2,090 kgs., Rs. 1,13,160.

ETHYL HEXYL PEROXY DICARBONATE: From FRG: Indian Petrochemicals Corpn., 4,800 kgs., Rs. 74,79,901.

ETHYL MERCAPTAN: From Netherlands: Indian Oil Corpn., 4,960 MTs., Rs. 1,33,823.

ETHYLENE-VINYL ACETATE COPOLYMER: From Belgium: Rivera Polymers P. Ltd., 22,000 kgs., Rs. 3,77,647.

GLYCERINE: From Australia: Coral Aromatics P. Ltd., 40,000 kgs., Rs. 6,86,631.

GLYCERINE 99%: From Bangladesh: Dr. Beck & Co., 16,000 kgs., Rs. 2,72,233.

GUM ROSIN: From Indonesia: Resins & Plastics Ltd., 36,000 kgs., Rs. 2,34,115.

HELIOTROPIN: From Japan: Hindustan Lever Ltd., 2,500 kgs., Rs. 9,86,798.

HELIUM LIQUID: From USA: Pure Helium (I) P. Ltd., 2, Nos., Rs. 33,11,546.

HEXACHLORO CYCLOPENTADIENE: From USA: Excel Industries Ltd., 214 Mts., Rs. 53,01,259.

HYDROGEN PEROXIDE: 50%: From Australia: Tata Exports Ltd., 20,100 kgs., Rs. 1,83,132; From Taiwan: Keshavlal Talakchand, 3,990 kgs., Rs. 36,356; Sharda Synthetics (Bombay) P. Ltd., 3,990 kgs., Rs. 36,356; From UK: Yeing & Mfg. Co. Ltd., 17,745 kgs., Rs. 1,59,333.

HYDROSULPHITE: From FRG: Virag Enterprises, 20,000 kgs., Rs. 2,24,476.

HYDROXYLAMINE SULPHATE: From FRG: Roche Products Ltd., 18,000 kgs., Rs. 4,70,299.

HYDROXY PROPYL METHYL CELLULOSE: From Japan: Gufic P. Ltd., 50 kgs., Rs. 15,765; Roche Products Ltd., 750 kgs., Rs. 1,77,560.

3-HYDROXY QUINALDINE 4-CARBOXYLIC ACID: From FRG: Nirup Synchrome Ltd., 950 kgs., Rs. 3,20,555.

HYDROXY QUINOLINE: From Singapore: Kirti Chemicals, 1,000 kgs., Rs. 1,88,688.

IODINE CRUDE: From Channel Islands: Lub-Chem, 3,000 kgs., Rs. 7,72,460; From China: Eskay Fine Chemicals, 2,000 kgs., Rs. 5,17,614; From Japan: Lub-Chem Inc., 1,000 kgs., Rs. 2,63,986.

ISOEUGENOL: From France: S.H. Kelkar & Co. Ltd., 2,000 kgs., Rs. 2,72,012.

LACTOSE: From Netherlands: E. Merck (I) Ltd., 8,000 kgs., Rs. 90,214.

LITHIUM HYDROXIDE MONOHYDRATE: From USA: D.J. Fluorine, 4,400 Lbs., Rs. 99,780.

MAGNESIUM OXIDE: From FRG: Cable Corporation of India Ltd., 700 kgs., Rs. 23,970.

MERCURY: From China: S. Chemicals & Pharmaceuticals, 1,725 kgs., Rs. 2,10,677.

1-METHYL-4-PIPERIDONE: From Belgium: Bayer (I) Ltd., 1,600 kgs., Rs. 6,35,122.

MICROCRYSTALLINE WAX: From Spain: Devichand & Co., 17,488 kgs., Rs. 1,73,963.

ORTHOANILIC ACID: From FRG: Atic Industries Ltd., 3120 kgs., Rs. 3,53,712.

ORTHO-CHLORO-P-NITROANILINE: From Japan: Golden Chemical Inds., 1,000 kgs., Rs. 81,747.

PARA FORMALDEHYDE: From Spain: Jindal Dye Intermediate P. Ltd., 18,000 kgs., Rs. 1,02,203.

PARA-HYDROXY PHENYL ACETAMIDE: From Japan: Win Laboratories P. Ltd., 600 kgs., Rs. 4,14,041.

PARA TERTIARY BUTYL PHENOL: From FRG: Usha Thermosets P. Ltd., 12,000 kgs., Rs. 2,19,189.

PENTACHLOROTHIOPHENOL: From FRG: Bayer (I) Ltd., 12,600 kgs., Rs. 15,86,189.

PHENYL ALPHA NAPHTHYLAMINE: From FRG: K. Patel Chemo Pharma P. Ltd., 2,400 kgs., Rs. 1,80,587.

PIPERAZINE: From Sweden: Eskay Fine Chemicals, 7,600 kgs., Rs. 2,12,146.

POLYESTER CHIPS: From Indonesia: Garware Plastics & Polyester Ltd., 13,300 kgs., Rs. 2,38,114.

POLYETHYLENE WAX: From USA: Gausia Export Enterprises, 1,000 kgs., Rs. 34,596; Tata Exports Ltd., 907 kgs., Rs. 23,229.

POLYVINYL ALCOHOL: From Japan: Polyorganic Chemicals P. Ltd., 3 MTs., Rs. 96,886; Sandeep Chemicals P. Ltd., 2,000 kgs., Rs. 60,740; Sulzer Synthetic P. Ltd., 3,000 kgs., Rs. 91,111; Vareli Textiles Inds. Ltd., 5 MTs., Rs. 1,68,357.

POLYURETHANE RESIN: Panchaneel Paints, 1,000 kgs., Rs. 51,464.

POTASSIUM PERSULPHATE: From FRG: The U.P. Exports Corpn., Ltd., 2,000 kgs., Rs. 38,293.

N-PROPANOL: From USA: Alembic Chemical Works Co. P. Ltd., 13,200 kgs., Rs. 1,74,299.

PROPIONIC ACID: From UK: Mico Products Ltd., 15,366 kgs., Rs. 1,71,534.

PROPYLENE GLYCOL: From USA: Cadila Chemicals P. Ltd., 3,010 kgs., Rs. 39,746; Pfizer Ltd., 33,540 kgs., Rs. 3,98,590.

ROCK PHOSPHATE: From Jordan: Dharamsi Morarji Chemical Co., 6,000 MTs., Rs. 47,35,749.

SODIUM METABISULPHATE: From Hong Kong: Universal Chem Products, 15 MTs., Rs. 71,613.

SULPHUR: From UAE: MM-TC., 8,719 Mts., Rs. 1,49,27,489.

TITANIUM DIOXIDE: From Italy: Asian Paints (I) Ltd., 32,000 kgs., Rs. 9,95,088.

TRIMELLITIC ANHYDRIDE: From USA: Marpol Chemicals P. Ltd., 1,021 kgs., Rs. 32,798.

VINYL ACETATE MONOMER: From Netherlands: Mafatlal Dyes & Chemicals, 5,370 kgs., Rs. 1,34,597.

2,4-XYLIDINE: From Switzerland: Devarsons P. Ltd., 2,000 kgs., Rs. 1,32,162.

DRUGS MATERIALS IMPORTED BOMBAY

(From 27.6.88 to 30.6.88)

**CALCIUM D-PANTOTHE-
NATE:** From UK: Roche Products
Ltd., 350 kgs., Rs. 73,945.

CHLOROPROMAZINE HCL :
From USSR: Seva Enterprises,
536 kgs., Rs. 1,89,135.

LACTOSE USP BP/IP: From
New Zealand: Pharma Sales Cor-
pn., 18,000 kgs., Rs. 1,90,145.

PANCREATIN IP: From FRG:
Hoechst India Ltd., 22,500 kgs.,
Rs. 1,02,61,062.

TANNIC ACID B.P.: From
Belgium: Camlin P. Ltd., 62 kgs.,
Rs. 11,342.

TARTARIC ACID BP/USP :
From Spain: Lupin Laboratories,
36,000 kgs., Rs. 13,73,792.

TETRACYCLINE HCL BP 80.:
From China: DWD Pharmaceuti-
cals, 1,000 kgs., Rs. 2,90,596.

VITAMIN B6 IP: From FRG:
E. Merck (India) Ltd., 850 kgs.,
Rs. 4,26,504.

PLASTIC MATERIALS IMPORTED BOMBAY

(From 27.6.88 to 30.6.88)

CAPROLACTAM: From Ne-
therlands: Nirlon Synthetic Fi-
bres & Chemicals Ltd., 306 Mts.,
Rs. 76,36,665.

DELRIN: From USA: Garware
Plastics & Polyester Ltd., 14
MTs., Rs. 3,69,725.

HDPE: From Hungary: Niyu-
prene Plastics Co. Ltd., 49.5
MTs., Rs. 8,82,398; Sharp Impex
Ltd., 94.5 MTs., Rs. 14,97,385;
From Italy: Narmada Stockwel P.
Ltd., 16.5 MTs., Rs. 3,62,810;
From Saudi Arabia: Rajdhani
Plastics, 49.5 MTs., Rs. 8,62,-
779.

LDPE: IPCL, 1,006 MTs.,
Rs. 1,80,43,595; From Singa-
pore: Auroplast India Ltd., 17

MTs., Rs. 2,91,818; From Yugo-
slavia: Plasticolors Corpn., 100
MTs., Rs. 18,48,624.

LLDPE: From Saudi Arabia:
Dynamic Packagings, 24.75 MTs.,
Rs. 4,76,123.

POLYACETAL RESIN: From
Japan: Plasto Traders, 17,000
kgs., Rs. 4,26,504.

POLYAMIDE RESIN: From
Italy: Devidayal Electronics Wir-
es Ltd., 220 kgs., Rs. 13,184.

POLYPROPYLENE: From Bra-
zil: Kalyani Enterprises, 190
MTs., Rs. 26,59,377; From Cana-
da: Mutual Steel Industries, 30,-
000 kgs., Rs. 5,07,050; From
France: Gujarat Propack Ltd., 48,-
750 kgs., Rs. 9,53,922; From
Singapore: Milan Inds., 16 MTs.,
Rs. 3,00,005; From USA: The
Supreme Inds., Ltd., 30 MTs.,
Rs. 5,07,051; Tata Exports Ltd.,
155 MTs., Rs. 28,25,880.

**POLYPROPYLENE COPOLY-
MER:** From Italy: Caprihans Ind.
Ltd., 30,000 kgs., Rs. 5,56,568.

POLYSTYRENE: From Singa-
pore: Thermopack Inds., 10 MTs.,
Rs. 2,57,448.

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terprises Ltd., 262 kgs., Rs. 69,-
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Mechanical Packaging Inds., P.
Ltd., 2,000 kgs., Rs. 1,70,337.

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win Plastic Industry, 30 MTs.,
Rs. 4,79,322; Supreme Industri-
es Ltd., 100 MTs., Rs. 15,97,-
739; From Korea: Bharat Pipes
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96,96,360; From Yugoslavia :
Jain Compounding & Formulation
P. Ltd., 200 MTs., Rs. 30,21,718;
Jayee PVC Pipes P. Ltd., 200
MTs., Rs. 30,21,718; Kanchan
Pipes P. Ltd., 100 MTs., Rs. 13,-
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200 MTs., Rs. 27,78,458.

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From Yugoslavia: Kanchan Pipes
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GRADE):** From Brazil: Avinyl
Polymers P. Ltd., 20 MTs., Rs.
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sion Extrusions, 50 MTs., Rs.
7,98,869; Radiant Cables P. Ltd.,
50 MTs., Rs. 7,98,870; From
Hungary: More Water Pipes Ltd.,
192 MTs., Rs. 29,25,455; From
Mexico: J.C. & F.P. Ltd., 250
MTs., Rs. 37,93,530; From Ru-
mania: Kundalia Industries, 250
MTs., Rs. 39,17,425.

VINYL RESIN: From USA: Vi-
mal Enterprises P. Ltd., 2,250
Lbs., Rs. 55,503.

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(From 27.6.88 to 30.6.88)

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From Indonesia: Dina Textiles:
259 kgs. Rs. 27,530.

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(From 1.7.88 to 31.7.88)

ACETO NITRILE: From Tai-
wan: Satyan Pharma chem., 12,
000 kgs., Rs. 1,68,644.

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FRG: Chandra Pharmls. Ltd., 28,-
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26,117.

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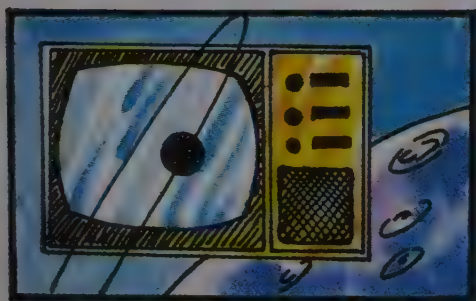
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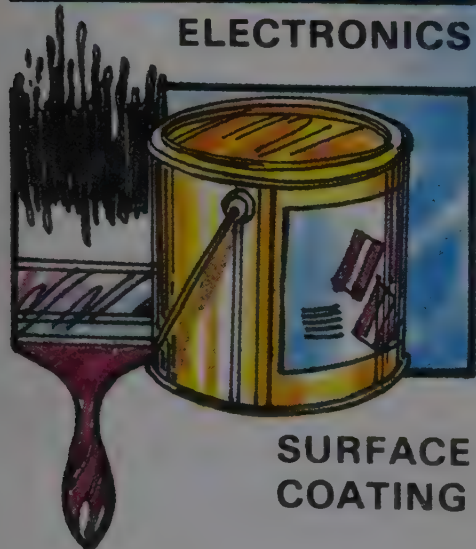
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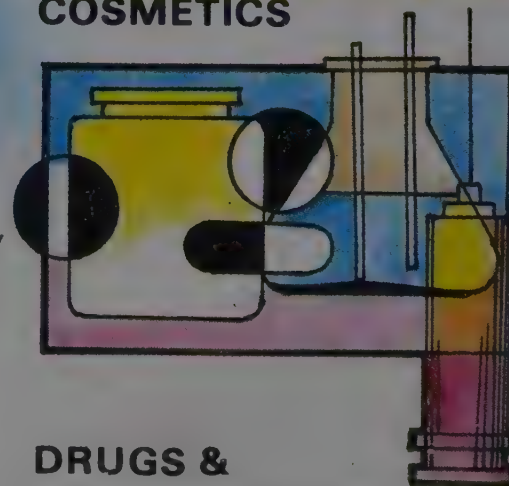
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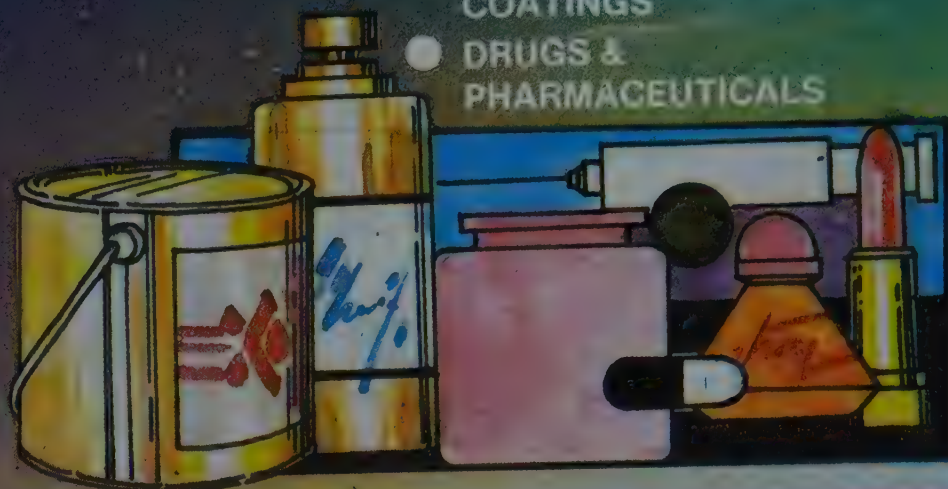
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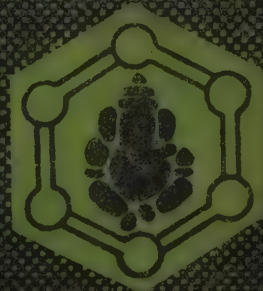
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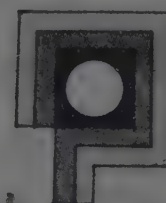
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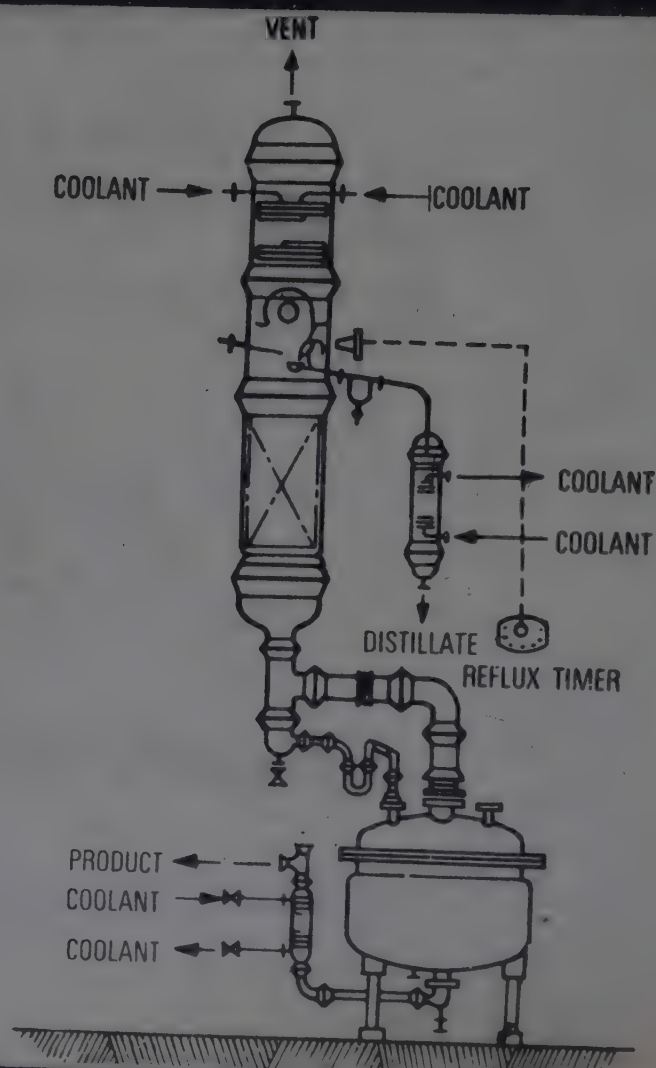
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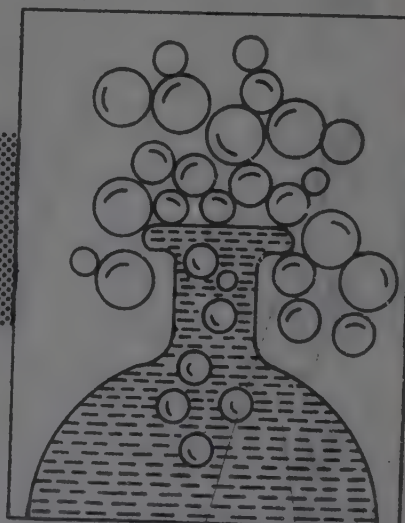
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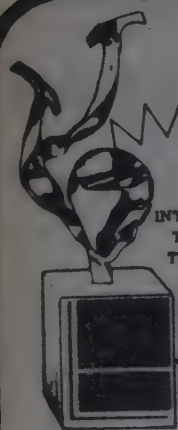
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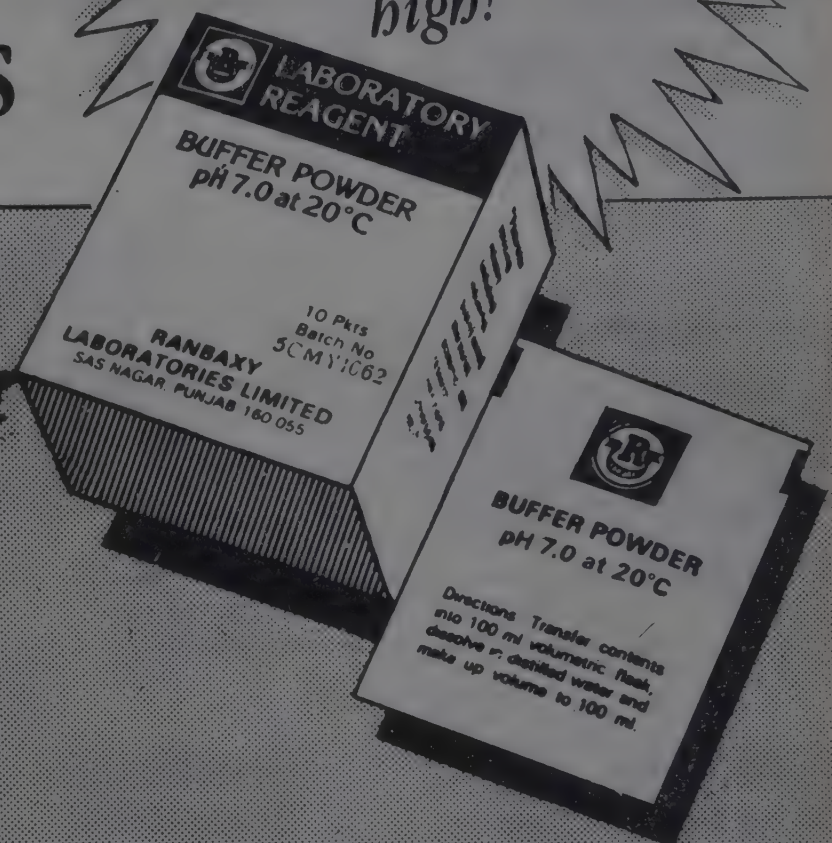
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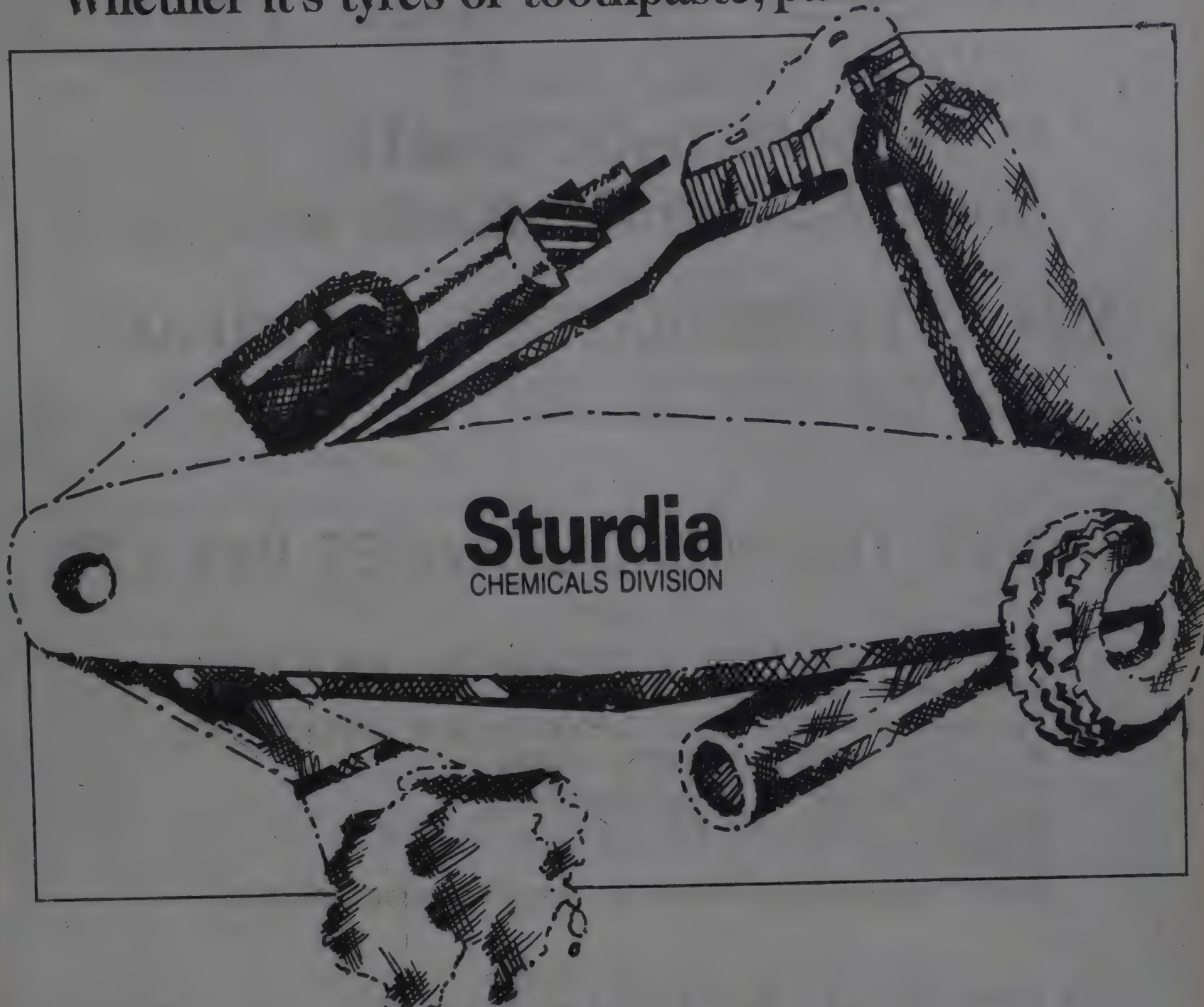
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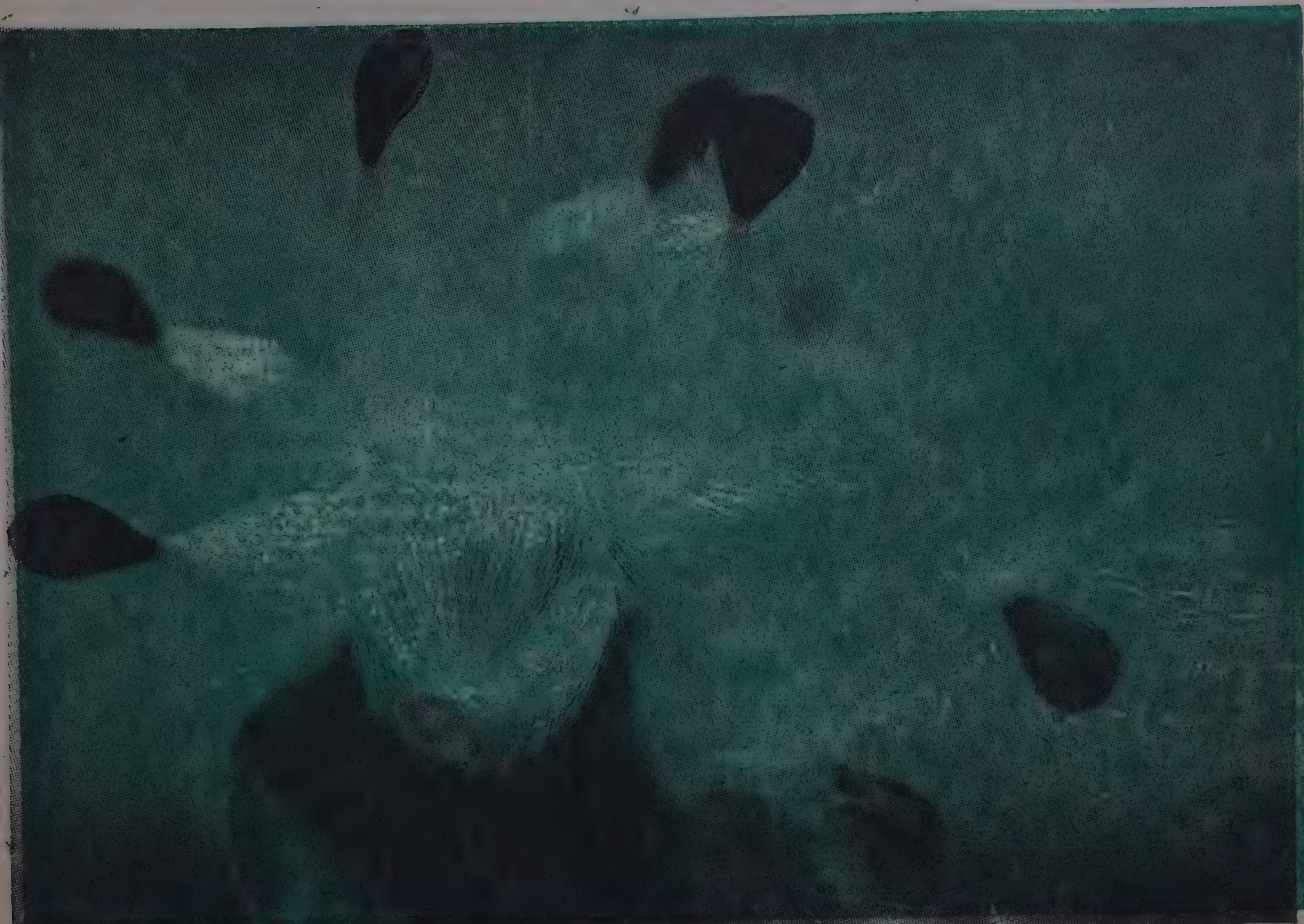
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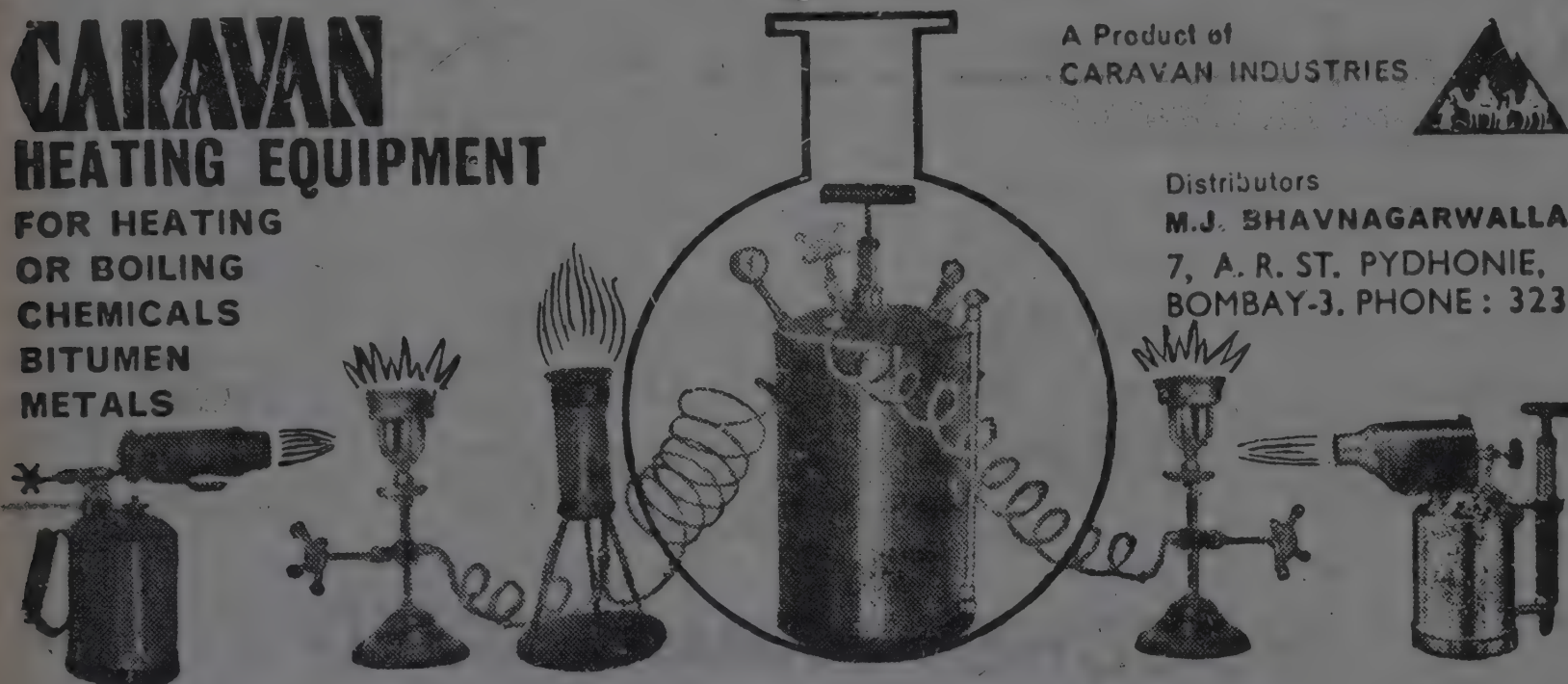
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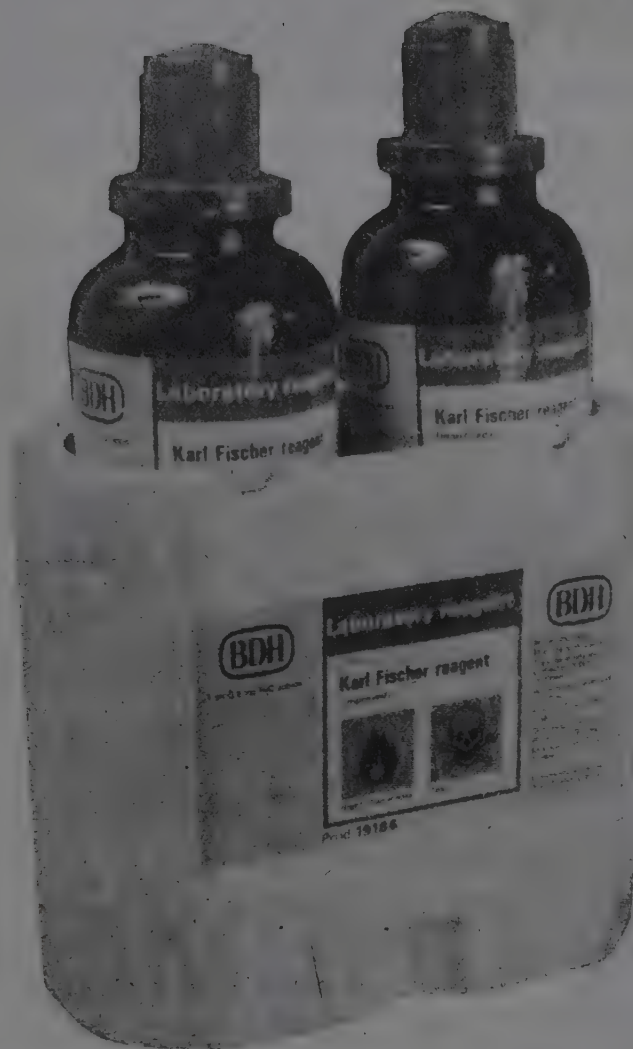
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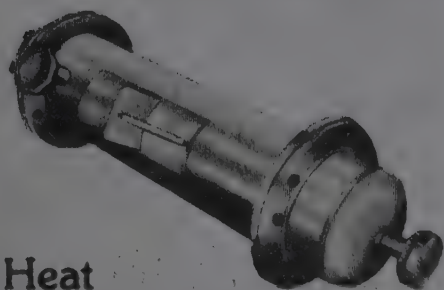
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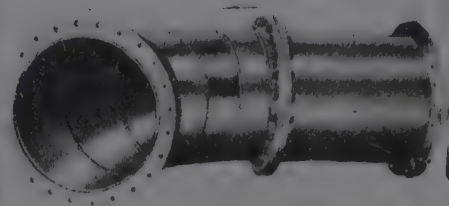
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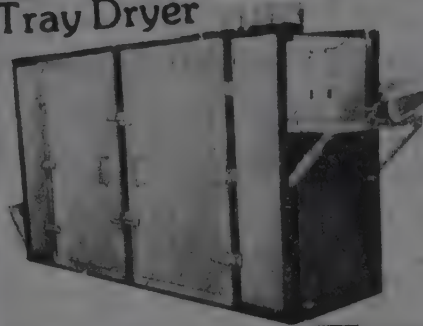
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CHEMICAL WEEKLY

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NO. 6

Chemical Warfare -- Is the threat real?

The first recorded case of chemical warfare took place at Ypres on 22nd April 1915. Ypres was a modest market town in South Eastern Belgium about eight miles north of the French Border and less than thirty miles inland from the French Port of Dunkirk. The German bombardment on this date aimed at a breakthrough to drive the Canadians and French Africans holding the line for the Allies back to the seashore. A German rocket signal went up. A greenish yellow cloud hissed from nozzles and drifted with the wind across no man's land. It drifted across the sandbagged Allied parapets. Men who breathed it screamed in pain and choked. It was chlorine gas, caustic and asphyxiating.

Masses of Africans and Canadians stumbled back in retreat into no man's land, other masses, surprised and utterly uncomprehending, staggered out of the trenches into no man's land. The men writhed in agony, tens of thousands of them, serious casualties while five thousand others died; entire divisions abandoned the line.

Germany had achieved the perfect surprise. All the belligerents had agreed under the Hague Declaration of 1899, "concerning Asphyxiating gas" to abstain from the use of projectiles, the sole object of which was the diffusion of asphyxiating or deleterious gas. None seemed to think that tear gas was covered by this declaration, even though tear gases are more toxic than chlorine. The French used tear gas in the form of rifle grenades as early as August 1914, the Germans used it in artillery shell fired against the Russians at the end of January 1915 and against the British two months later in March. The chlorine attack at Ypres was the first major and deliberate poison gas attack of the First World War.

This attack had been well planned. Otto Hahn, a lieutenant in the infantry reserve helped to install gas cylinders, 5730 of them containing 168 tonnes of chlorine. The procedure was simple. To commence the attack with gas, a lead pipe had to be connected to the cylinder valves and then run the fire over the parapet into no man's land and wait for a rocket signal to open the valve at a predetermined rate. Chlorine, depressurised boils at -28.5°F.

In the first attack the Germans had not appraised its tactical value. It had not massed any reserve troops behind the lines to follow up. Nothing came out of that surprise attack except the misery to the allied troops, mostly Canadians and Africans.

Chemists among the survivors had no difficulty in recognising the chlorine attack; within a week, the women of London had sent

300,000 pads of muslin wrapped cotton soaked in hypolulphite -- the crude gas mask, was made and delivered to the front in record time.

The Germans were convinced that since their armies had got bogged down on the Western Front, they could get moving only with new weapons which because of the massive German chemical industry, could only be through chemical warfare.

Otto Hahn also directed the second gas attack in June 1915, this time as the Eastern Front in Galicia "the wind was favourable and we discharged a very poisonous gas a mixture of chlorine and phosgene against the Russian army lines -- Not a single shot was fired -- The attack was a complete success" was his own account of this exploit.

The French retaliated early in 1916 with phosgene artillery shells, also dispersed from mortar like projectiles and bombs. This was by far the most toxic gas used being ten times more toxic than chlorine, fatal in ten minutes at the concentration of half a milligram of gas per litre of air. This caused more than 80% of the gas casualties of the war.

Chloropicrin -- the British called it vomiting gas and the Germans called it Klop -- a vicious compound of picric acid and bleaching powder -- was the next to be used. Germans used it against the Russians in August 1916. Its special virtue(!) was its chemical inertness. It did not react with several neutralising chemicals packed in gas mask canisters -- only the modest layer of activated charcoal could remove it from air by adsorption. A high concentration could saturate the charcoal and get through. It worked like tear gas but induced nausea, vomiting and diarrhoea as well. Men raised their helmet to vomit, if Klop had been mixed with phosgene, as it usually was, it becomes lethal. Chloropicrin was simple and economic to manufacture -- the cheapest of war weapons.

The most horrible gas of the war was dichloroethyl sulphide, known for its horse radish -- mustard like smell, referred to as mustard gas. The Germans first used it on the night of 17th July 1917, in an artillery bombardment against the British at Ypres. The attack came as a complete surprise and caused thousands of casualties even though defence in the form of effective gas mask had been introduced. Shells marked with yellow crosses were rained down on the men at Ypres. At first they experienced not more than sneezing and many put away the gas masks. Then began the vomiting. The skin reddened and began to blister. The eyelids become

inflamed and swelled shut. They had to be led away blinded to the aid stations -- nearly 14,000 had to be treated in the three weeks following the July attack. Hitler, who was then a mere lance corporal, was one of those blinded by mustard gas Ypres, on the German soil, from a German attack.

In low concentrations, the mustard smell was not present and the gas was extremely toxic. It was clear that the gas mask could not afford protection. The gas persisted for malls in the first. A gas mask alone no longer supported as protection. Mustard gas dissolved rubber and even leather. It got soaked through multiple layers of cloth. One could bring enough gas at the sole of his boot to blind temporarily all his room mates. It could also blend with other gases as a disguise. The Germans sometimes chose to disguise mustard gas with xylol bromide, a tear gas that smells like lilac and it so came to pass in war time spring, that men ran in terror from a breeze scented with blossoming of lilac shrubs.

There were other gases as well sneezing gases, arsenic powder and combination of a dozen tear gases. The French loaded artillery shells with cyanide but to no purpose since the resulting vapour being lighter than air escaped into the atmosphere with no damage at ground level.

Fritz Haber, who was to win the Nobel Prize in 1918 for his ammonia synthesis work was in charge of gas warfare. The resultant loss of human lives was more than what his wife could bear. She demanded that her husband give up this nefarious work on warfare. Haber gave the now famous reply that a Scientist in peace time belongs to the world but in times of war only to his country. His wife committed suicide the same night. It is a strange irony of fate that he survived the war and discovered the ammonia synthesis route, which, being the base for fertiliser industry, still benefits the entire humanity.

By the end of World War I some 180,000 were injured and 8,000 killed by chemicals representing 9% of the total injured and 1.5% of the total killed among British forces.

The United States army were slow to respond to gas warfare because it assumed that masks would adequately protect US troops. It was only in 1917 the US Army Ordnance began to construct a vast war gas arsenal at Edgewood Maryland on waste and marshy land.

The plant contained 550 buildings and it could manufacture chlorine, phosgene, chloropicrin, sulphur chloride and mustard gas. By the end of the war it had the capacity to manufacture gas supplies to fill 1.1 million 7.5mm gas shells a month. "Had the war lasted longer", commented, a British military strategist, "this plant would have been the most significant contribution by the Americans to the First World War".

At last the United Nations has come out with a report that Iraq used chemical weapons prohibited under the Geneva protocol of 1925 (to which Iraq is a signatory) in its war with Iran, which has recently been called off.

This is the eighth U.N. report on the use of chemical weapons

in the Gulf War. The previous reports were quietly shelved, without the Security Council or the International Community taking any serious notice of them. Though one report in *The Independent*, London (August 2), dates the beginning of the use of chemical weapons in Iran in 1984, there are reasons to believe that these might have been used even earlier, when the Iranians posed a threat to Basra. How did Iraq get its chemical weapons? The Iraqis claim they manufactured them in their own country. Dr. Julian Perry Robinson, a chemist of high integrity concurs. However, it is accepted that chemical ingredients for the weapons would have been obtained by the Iraqis from western sources. The mustard gas is made from ethylene and sulphur chloride, which are readily available in the market. The nerve gas used by Iraq can be made from pesticides. The Iraqis are reported to have used a number of supply channels from western European countries and finally made the weapons. Dr. Perry Robinson points out that, when a company suddenly finds orders amounting to three or four times its usual annual turnover and the client happens to be Iraq, it should have begun to wonder. Apparently, they did not or profits were above business ethics.

If a weapon whose use is banned by international agreement for 63 years can be used by a nation and the international community and the Security Council would allow it to get away with it, what use then is the nuclear non-proliferation treaty? The Geneva protocol of 1925 totally prohibits the use of chemical weapons except in retaliation.

The Iraqis argue that they used the chemical weapons on their own soil, against forces which attacked their territories and forces. The U.S., UK, pledge does not rule out use of nuclear weapons, even if the country concerned is first attacked by their forces. The Iraqi use of chemical weapons and the inaction of the UN Security Council should make us in India think about the implications for our security, against probable indulgence in chemical warfare by our neighbour.

There are reports of Pakistan having secured chemical weapons and their officers having undergone training in chemical warfare in Fort Ketterick, U.S. During the Second World War, Hitler did not use chemical weapons except against unarmed Jews. The deterrent worked, just as it has worked in the case of nuclear weapons. It would have worked in the case of Iraq as well, if Iran had possessed similar weapons to combat chemical warfare.

"There is no need for India to go in for chemical weapons" appears to be the Government policy. One can only hope for the best.

The U.S. and Western international community made much of yellow rain in Kampuchea (which turned out to be false) and fabricated stories on Soviet use of chemical weapons in Afghanistan. But they tilted in favour of Iraq in a war, where they knew that the Iraqis had been using chemical weapons extensively. After all this, how can any sensible Indian security planner rely on any international agreement or the U.N. and its Security Council to ensure that chemical and nuclear weapons will not be used against this country?

— T.P.S. RAJAN

(Source: "The long grave already dug" Chapter 4 "The Making of the Atom Bomb")

CHEMARENA

S.L. VENKITESWARAN

Plastic Bumpers for Autos

Automotive bumpers have achieved a spectacular success and may soon hit a 830,000 tonnes market according to a survey in U.S.A. There is a penetration of 90% of bumper fascia market with injection molded

polyolefins holding about 50% and polyurethanes 24% and rigid engineering thermoplastics 20%. The various regions and types of use are given in the table below:

(1000 tonnes)

		Fascia	Reinforcing beam	Energy absorber	
N. America	Passenger Cars	75	83	36	
	Trucks	47	86	--	
W. Europe	Passenger Cars	87	81	38	
	Trucks	15	27	--	
Japan	Passenger Cars	62	55	23	
	Trucks	44	70	--	
Total:	Global	330	402	97	829

Paper and Packaging -- share of plastics

Synthetic paper of BXL has made some progress with a new 2,000 tonnes a year plant in UK. This is a filled and modified polyolefine compound by a patented extrusion and stretching process and the "paper" is extremely tough and water proof. The main use is for children's books, posters, labels & tags, floppy disc envelopes etc.

The share of different materials for packaging in West Germany and Japan is estimated as under:

	Japan		W. Germany	
	DM bil.	%	DM bil.	%
Paper/Board	29.0	45.64	11.6	39.6
Plastics	14.0	22.25	8.9	27.6
Metals	9.3	14.1	6.4	22.6
Glass	2.7	4.3	2.2	7.7
Wood, textile, fiber, ceramic, soft rubber	8.7	13.1	1.4	2.5

The total market is 63.5 bill. DM in Japan from 18 mill.

Shopping bags of polyethylene are said to be environmentally better than paper as per W. German authorities evaluation.

Energy balance for 50,000 bags

	Plastics	Paper
Material requirement	1000 kg. PE	2500 kg. from 5 tonnes of tree wood
Emissions in production (sulphurous acid)	17 kg.	80-230 kg.

This is without reuse and will go down depending on reuse percentage.

Meanwhile Du Pont is making a bid for a larger share of European plastics market through better packaging materials. Elvax EVA copolymer will be made in association with DSM of Nederland and also Surlyn. Coextruded films are gaining ground and Sclar EVOH resins have 3.5 times higher oxygen barrier ability. Du Pont's estimate of European packaging market is as follows:

Total food/non-food**\$ billion**

Germany	16
France	12
UK	10
Others	17

Market Shares

Plastics	28%
Paper/Pulp	40%
Metal	21%
Glass	8%
Others	3%

Solid food consumes over 500 billion package units and liquids 300 billion. Plastics are expected to take over 50% share by end of the century.

But there are problems. It is expected that up to 80% of plastics may be mandated for reuse and some restrictions on items like PVC. Waste disposal will be an increasingly crucial problem with incineration and fuel value down the line.

Promising AIDS drug

The concern and controversies on AIDS continue with no early solution to the new disease but more promising drugs are being tested. AIDS is said to be caused by the HIV virus and a protein termed CD4 is said to be able to counter it. Now a soluble synthetic version of CD4, a glycoproteins found on the surface of the T4 helper cells (of white blood corpuscles) has been made. HIV virus is said to gain entry into the cells through binding with the CD4 protein and once inside HIV is on to its nefarious growth and multiplication and final destruction of the cell. The idea then is to be use decoys for CD4 to entice HIV to bind up and keep them out of danger of invasion into the T4 helper cells -- at least greatly curtail such entry into the cells. The synthetic CD4 does that but it is too early to have an idea of its effectiveness. The trials and tests are now approved on 50 patients over a six months period so that effective optimum dosage can be evolved for further testing. The CD4 analogue was made by Genentech but other groups are also on its trial and may come up with other versions, perhaps provide an effective counter to AIDS in the coming decade.

Although much has been learned about AIDS in a short time finding effective therapy or developing a vac-

cine against it remains a pressing and formidable challenge. AZT, or Zidovudine is also under testing [3'-azido-3'-deoxythymidine] and more synthetics are on the way besides the soluble CD4 protein. The work is slow and not all advances are comforting but the understanding of the disease has increased generating more hope. But there are sceptics who scoff at the whole theory of HIV being the root cause. There is no statistical or quantitative relationship between AIDS victims and the level of HIV in them. The long and latent period of infection is also cited as another reason for scepticism. But there are parallel developments of a feline AIDS type disease and a recent successful infection of macaque monkeys with a SIV version of HIV. Most scientists believe that there is a strong correlation between the level of virus replication and the chance of going on to develop clinically significant disease. Meanwhile WHO estimates that more than 200,000 cases of AIDS have occurred worldwide and 150,000 new cases will occur in 1988. Perhaps 5 million are infected today (including dormant cases) and a million more in 5 years. In some parts of Africa there is a reported 25% infection of people between 20 and 40 years of age. The testing of all promising drugs is awaited with great anxiety.

Epoxidised Natural Rubber

Epoxidised natural rubber ENR has been developed by the Malaysian Rubber Research and Development Board towards the end of 1987 and has proved very valuable elastomer now marketed as "Dynaprene". It is made by the epoxidation of the latex under conditions to yield grades of 25% to 70% mol of carbon epoxidised as per reaction below:



During epoxidation a certain amount of gel is formed which is subsequently broken down by peptizers or

physically. The ENR grades have been extensively tested for ageing up to 4,000 Hrs. and against ultraviolet radiation. As a sealant it has good adhesion to glass. It can be compounded with other epoxy resins as well. ER 50 and Araldite PT 810 is said to be an excellent combination. The material is said to be excellent sealant and adhesive for a new generation of spaceless incubation glass system and as sealants in automotive and construction industry with good tensile strength. The ENR network can also be reinforced with fillers and curing agents like tertiary amines accelerate the polymerisation reaction and curing. ENR is expected to add the range of usage of NR.

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Chembur Carbide unit to be sold

Union Carbide India Ltd. (UCIL) has signed a memorandum of understanding (MOU) to sell its chemicals and plastics undertaking, located at Chembur, to Oswal Agro Mills Ltd.

The company has been trying to sell, relocate or to effect closure of its Chembur plant for quite some time. However, the management has found the problem "extremely complex". It has called for tenders for disposing of its Chembur plant, and has been negotiating with several parties.

According to the MOU, Oswal Agro Mills will absorb, with interruption in service, all employees of the unit on terms not less favourable from those, which they currently enjoy, and will assume full responsibility for all their benefits.

According to Mr. V. P. Gokhale, chairman and managing director of UCIL, the signing of this MOU is an important step towards the restarting of the plant which has been "non-operational" for a considerable length of time because of the company's inability to run the plant under the existing constraints it faces.

Mr. Gokhale has said that this uncertainty has been causing concern to employees, shareholders, the industry and government. He feels that the recent announcement of the state government that it supports the restarting of the plant at its current location augurs well for the interests of the company's employees.

The agreement between Union Carbide and Oswal Agro Mills is of course subject to the approval of the appropriate government authorities and financial institutions, as also by the shareholders of Union Carbide.

The management of Union Carbide is hopeful of obtaining necessary governmental and other approvals for the sale soon.

According to Mr S. Bose, director-in-charge of chemicals and plastic business of UCIL, the MOU provides that a premier engineering consultancy firm carry out checks to ensure the "integrity of the plant and its safety system."

Experts will also supervise the start-up of the plant, and thereafter provide technical support for a specified period.

Oswal Agro Mills, which started with solvent extractions and vegetable oils

as business, has been trying to diversify its activities to include the manufacture of chemicals and petrochemicals. Recently it has increased the capacity for the manufacture of toilet soaps and of the sugar mill, which it had taken over last year.

Diversification Plan

With the assured supplies of molasses, it has taken steps to diversify into the manufacture of vinyl acetate monomer (VAM), acetic acid, acetic anhydride, all high growth and high profit products, consumed mainly by the paint and synthetic fibre industries.

A project is being planned at Dhuri in Sangrur district of Punjab. The company has also secured an industrial licence for the manufacture of 15,000 kilo litres of industrial alcohol per annum.

The three companies in the group — Oswal Agro Mills, Bindal Agro Chem, and Oswal Agro Furance — have been doing well during the past few years. In order to enter the field of plastics raw materials, namely low density polyethylene (LDPE) based on molasses, the company had agreed to take over the LDPE plant of IEL Ltd., Calcutta.

It was decided to shift the plant, with a licensed capacity of 15,000 tonnes per annum, from Rishra near Calcutta to a place in Uttar Pradesh, where the raw material is available in abundance. However, the company could not get the state government permission to shift the plant from Calcutta.

The issue of compensation for the factory following the leak of methyl gas victims at Union Carbide's Bhopal factory following the leak of Methyl isocyanide (MIC) disaster of December 1984 at the company's pesticide plant, which left 2,850 people dead and over 2.5 lakh maimed, is still to be decided.

Divergent views have been expressed in several quarters, about whether the settlement with Union Carbide should be done out of court.

UCIL along with its parent company Union Carbide Corporation in the U.S. has been trying to fight the legal battle at various courts.

The government of India has assumed responsibility to uphold the Bhopal victims' interests under the Bhopal Gas Leak Disaster (processing of claims) Act, 1985.

According to Mr. Abhey Oswal, chairman and managing director of Oswal Agro Mills, the compensation to be paid to UCIL is Rs. 58.5 crores. This compensation money is expected to be kept in a blocked account for utilisation while settling the Bhopal gas leak case.

Mr. Oswal has said that the total cost of the plant to his company will be around Rs. 75 crores, including the cost of start-up, and payment of taxes etc. The cost of a new plant of this size would be around Rs. 150 crores. The book value of the assets being taken over by Oswal Agro Mills is around Rs. 12 crores.

Mr. Oswal has said that Engineers India Ltd. (EIL) have been appointed as the consultants for carrying out pre-commissioning checks.

This work is expected to start shortly and the plant is expected to restart by January or February 1989. This will add to the company's turnover by Rs. 125 crores per annum.

Mr. Oswal has said that the new management proposes to spend another Rs. 30 crores on the plant. Later, additional investment of Rs. 150 to 175 crores will be made to add some new down-stream products.

Well-maintained

Since the plant has been well-maintained, he does not expect any difficulty in achieving high capacity utilisation, although it is 20 years old.

As is known, the petrochemical complex is located on a total area of 25 hectares of land. It has India's first naphtha cracker plant with a capacity of 80,000 tonnes per annum to produce 20,480 tonnes per annum of ethylene, 8,800 tonnes of propylene, 400 tonnes of acetylene, 2,800 tonnes of benzene, 2,000 tonnes of toluene and 5,200 tonnes of dipropylenes, which are the raw materials for the chemical and plastics industry.

The complex has further manufacturing facilities for producing 20,000 tonnes per annum of LDPE.

It also has facilities for the production of alcohol-based chemicals like acetic acid, (4,500 tonnes per annum) butanol (4,000) butyl acetate (2,250) ethyl acetate (1,750). In addition, it has facilities to produce annually 900 tonnes of acetylene black, which is used for battery cells.

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TN chemical units plea for raw materials supply

The Chemical Industries Association, (formerly the Tamil Nadu Chemical Manufacturers Association) in a Memorandum submitted to Mr. Shyam Suri, Joint Secretary, Department of Chemicals, New Delhi, on the problems of Chemical Industries in the Southern Region have made a strong plea to ensure continuous supply of vital intermediates such as Benzene, Toluene, Xylene etc. The following is the text of the memorandum submitted:

Problems of Chemical Industry in Tamil Nadu and the Southern Region are many. While there are problems which affect individual units and problems of very general nature that affect the chemical industries in general, and whereas a study of all the different types of problems is necessary to ensure healthy growth, we, as an Association, are inclined to focus only some of the very general and most important problems at the moment.

1. Inadequate supplies of basic raw materials for the organic chemical industries was always and continues to be a major constraint to the general growth of chemical industries in the South. Non-availability of feed stocks such as Benzene, Toluene, Xylene etc., in this Region, and inadequate quantities prove to be a hindrance to units manufacturing Pharmaceuticals, Drugs, Dyes and Intermediates etc. Production of these feed stocks are concentrated in the Maharashtra/Gujarat belt and is mostly in the hands of Government or Government owned industries. We often find that in the matter of allotment, particularly when scarcity conditions exist, it is the Southern units which are starved most.

To overcome this, to our mind, the following steps have to be taken by the Government of India.

- a. Institute whatever steps that the Government may consider necessary, suitable and adequate to ensure availability of these basic materials to Southern Customers at the same price as it is available to other customers in other Regions of India including the Western Region. This can perhaps be done by instructing the producers to create bulk storage facilities in suitable locations in the Southern Region and also instituting a system of pool price as is being done in the case of Steel or to the Northern Customers of Phenol and Acetone by H.O.C.L. where freight subsidy upto Rs. 1,500/- per M.T. is given.
- b. Our Association was representing to the Government of India to consider the installation of a Naphtha Cracker unit in Madras. Now that the Government of India has decided against the setting up of a Naphtha Cracker in Madras on wiser counsel it should take up the moral responsibilities to find out alternate arrangements to ensure the availability and we hope that Government of India will not ignore this just claim of Southern Region as usually done in many other matters also.
- c. We also suggest that Import of all basic feed stocks such as Benzene, Toluene, Xylene etc., may be permitted under OGL and with concessional Duty of 70% till such time the Government of India is able to ensure supplies of these materials readily and at equal price at which it is available to customers in other Regions. Any hesitation on the part of the Government to institute such a step can be viewed by us only as discriminatory against the Southern Region.
2. Intermediate chemicals such as Diethylene Glycol/Ethylene Oxide are being produced and distribu-

ted by NOCIL and IPCL. Many units in the South and particularly Small Scale Industries engaged in the manufacture of Leather finishing chemicals, Leather Auxiliaries, Brake fluids, Lubricants, Resins etc., are often starved because of inadequate supply of these materials and when available from Bombay they have to pay heavy transport charges which their Western Region competitors do not have to incur. In this case also, we suggest that Import under OGL at concessional Duty of 70% may be allowed till such time the Government is able to ensure adequate supplies at equitable prices, failing which, we are afraid, that many Small Scale Chemical Industries will slowly face financial crisis and eventual closure.

3. A very peculiar situation is created in case of availability of certain chemicals due to the vacillating stand of Government of India — for example Acetic Acid. Six months ago Acetic Acid was available in plenty, however today there is a scarcity condition and prices are soaring. It seems that the same lobby which was fighting against creation of additional capacity for production of Acetic Acid through petro chemical routes, is today working surreptitiously to create artificial shortage and boost the prices. On the other hand demand for Acetic Acid is bound to go substantially when the new PTA unit planned in Madras goes on stream. What is the Government's stand in this regard?
4. In case of Methanol, in Govt.'s own estimate a demand supply gap of 60,000 tons is established. We strongly feel that the Government should continue the present policy of allowing import of Methanol under OGL and give concessional Duty benefit till such time the demand-supply gap is filled by creation of additional indigenous capacity. In this regard, it may be recalled till recently the Government was giving subsidy to the extent of Rs. 1,200/- per tonne to ensure a pool price. Now that this arrangement is removed, consumers in Northern & Western Regions can lean on recently created additional

capacities in the Maharashtra/Gujarat belt. It is but natural that the consumers in the Southern Region expect from the Government a concessional Duty on Import, atleast to off-set the heavy transport burden (Rs. 700/- per tonne) which consumers in the Western Region do not have to bear.

5. In general, we suggest that as a policy, Government should not ban import of any basic feed stocks or intermediary chemicals & consumers and should have the option to Import all such items under OGL. Any curb on the quantum of Import shall be done only through fiscal policies — i.e. by changing the Duty structure and not by banning the Import.
6. Another aspect that we would like to draw the attention of the Government is regarding utilisation of Gas from Cauvery basin. Has the Government given serious thought? We suggest that the Government evolve a long term policy, keeping the requirements of chemical industry development as a thrust area.
7. Implementation of the pollution laws, both at the Central and State levels, seems to be lethargic and ineffective. Central Government do not seem to have a policy on disposal of final effluent after treatment. This is one area which needs serious and immediate attention. Government should identify disposal areas for solid and liquid effluents and also evolve a policy on establishing Chemical Industry Development Centres.
8. Regional DGTD offices, as constituted now are not effective and serve very limited or no purpose. They should be given well defined guidelines and powers so that they can become effective and useful Institutions.

REDUCTION IN NAPHTHA PRICE WELCOMED

Shri Anil B. Goradia, President, All India Plastics Manufacturers' Association, Bombay has welcomed the Government's decision to supply Naphtha and Benzene based raw materials at international prices to boost exports of chemicals, dyes and other allied items. In a statement issued to the press, he said, "It

is good to know that in order to work out the price reduction in the supply of downstream products based on benzene and naphtha, the Commerce Ministry has also finalised the related input and output norms for five benzene based and two naphtha based materials. However, there is a dual system operating in respect of international price so that the domestic processors in countries like USA, Singapore, etc. get their supply at lower price while the export price of the resin is higher some times to the extent of \$200 per tonne. It is therefore suggested that to determine the true price for polymer resins the Government should see to it that the naphtha and benzene based raw materials supplied are actually those which are made available to the US domestic processors and countries like Singapore. Only if this is done, will it help in the stepping up production of plastic products effectively and thus help in the export promotion task. Besides the plastics processing industry would very much like to see that the quantum of benefit the raw material manufacturers obtain covers the export requirements and no further burden is added to the already

high locally produced plastic raw material prices in India".

BRAND RATE FIXATION SCHEME FOR EXPORTERS

The Government announced on Oct. 12, a new simplified brand rate fixation scheme as an export promotional and procedural simplification measure. The brand rate scheme is aimed at compensating the exporter through the duty drawback facility for the duties paid on inputs used in export production. The duty drawback rates are fixed on the basis of brand rates where no uniform rates exist on an all-industry basis.

The simplified new scheme is being extended to exporters of engineering goods, electronic items and chemicals and envisages acceptance by the Government of the data presented by the exporter for the fixation of brand rates without pre-verification by the Government. The data submitted by the exporter will have to be certified by chartered engineers, cost accountants or chartered accountants and should relate to consumption of inputs and the duties paid on them.

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MES for critical chemicals to be worked out

The Department of Chemicals and Petrochemicals will work out the minimum economic size (MES) for critical organic and inorganic chemicals. It has also been decided to peg up demand projections for various chemicals, especially that of caustic soda.

The decisions were taken at an apex committee meeting of the department which discussed the exhaustive report prepared by the sub-group on organic and inorganic chemicals recently. The meeting was presided over by Mr. H. K. Khan, Secretary, Department of Chemicals and Petrochemicals.

The sub-group has been asked to identify critical items for which MES is to be worked out. It was noted that it would be imprudent to apply capacity constraints in many chemicals as these are delicensed items.

No recommendation should, therefore, be made on capacity constraints. The growth rate of titanium dioxide should be revised upwards to at least ten per cent in view of the growing domestic demand and export prospects.

It was also decided to amend the demand figures after taking into account the dormant letters of intent, likely exports and the need to have surplus capacity to meet unexpected spurts in demand. The sub-group has also been asked to study the possible use of surplus alcohol for production of a number of chemicals like ethylene current-

ly manufactured from the petrochemical route.

Mr. Y. Modi, convenor of the sub-group on inorganic chemicals pointed out that the export market at the time of finalising the report was not as encouraging as it is at present. An upward revision of demand projections was warranted especially in the case of caustic soda as export prospects of this chemical has suddenly brightened.

Exports of this item, unthinkable only a year ago, has now become possible because of a spurt in prices in the international market. The price rise has been owing to reduced production of caustic soda consequent to a drop in the demand for chlorine. Prices which were as low as \$90 C and F some two years ago, have now shot up to \$380 fob.

One South Indian firm has already exported 3,000 tonnes to a south-east Asian country. The sub-group in its report has recommended that all future expansions or new units in this sector should use only the membrane cell technology.

It may be recalled that the caustic/chlorine industry had approached the Government for cash assistance for exports. More than 50 per cent of the cost of production is accounted for by power, each tonne consuming on an average 3,400 kwh.

Mr. Ahmed Masood, Joint Adviser (Chemicals), Planning Commission,

called for a detailed study on alcohol based chemicals, particularly the cost of production of items like acetic acid from alcohol as well as the petroleum routes.

A senior official of the department said the conclusion of the sub-group, that capacity was more or less adequate for many alcohol-based chemicals like acetaldehyde, is not correct. Despite the surplus of alcohol, prices of items, like acetic acid, have been rising because of low production. He therefore, argued against a restraint on the capacity of these chemicals.

NO MOVE TO CHANGE HALDIA PARTNER

The West Bengal government had no plans to change the private sector partner in the joint sector project of Haldia Petrochemicals, Mr. Asiam Dasgupta, the state's finance minister said. When asked to comment on a report in a section of the press that the state government was sounding other businessmen to be partners of Haldia Petrochemicals, Mr. Dasgupta said it was totally baseless.

He however said the state government was yet to receive intimation from the Union finance ministry on the proposed discussion on Haldia Petrochemicals project. Mr. S. B. Chavan, Union finance minister, in a recent meeting with the state's chief minister had promised to call a meeting on Haldia within 15 days.

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Shelf-life of pesticides enhanced

On the basis of the acceptance of recommendations of the Standing Advisory Committee on Shelf-life of pesticides and their formulations by the Central Insecticides Board, the Registration Committee have enhanced the Shelf-life of the various products (s) as per details given below:

S. No.	Name of Manufacturer	Name of Insecticide	Enhanced Shelf-life
1.	Indofil Chemicals Co., Bombay	Mancozeb 75% WP	From 1 to 2 yrs.
2.	—do—	Zineb 75% WP	2 yrs.
3.	Cynamide India Ltd., Bombay	Temephos 50% EC	2 yrs.
4.	BASF India Ltd., Bombay	Carbendazim 50% WP	2 to 5 yrs.
5.	Volrho Ltd., Bombay	Phosalone 35% EC	2 to 3 yrs.
6.	Hindustan Ciba Geigy Ltd., Bombay	Phosphamidon 35% SL	1 to 2 yrs.
7.	—do—	Dichlorovos Tech.	1 to 1½ yrs.
8.	—do—	Dichlorovos 76% EC	1 to 2 yrs.
9.	—do—	Ziram colloidal suspension 27%	1 to 2 yrs.
10.	—do—	Monocrotophos 36% SC	1 to 1½ yrs.
11.	—do—	Diazinon 10% GR	1 to 2 yrs.
12.	Swarup Chemical, Lucknow	Ziram 80% WP	1 to 2 yrs.
13.	—do—	Thiram 75% WP	1 to 2 yrs.
14.	—do—	Thiram 75% DS	1 to 2 yrs.
15.	I.E.L., Madras	Paraquat Dichloride 24% SL	2 to 3 yrs.
16.	BASF India Ltd., Bombay	Fluchloralin 45% EC	2 to 3 yrs.
17.	—do—	Linocin (CCC) 50% AS	1 to 3 yrs.
18.	—do—	Tridemorph 80% EC	2 to 3 yrs.
19.	Bayer India Ltd., Bombay	Methyl Parathion 50% EC	1 to 1½ yrs.
20.	Sandoz (India) Ltd., Bombay	Quinalphos 1.5% DP	1 to 2 yrs.
21.	—do—	Quinalphos 5% Gr	1 to 2 yrs.
22.	—do—	Formothion 25% EC	1 to 2 yrs.
23.	—do—	Quinalphos 25% EC	1 to 2 yrs.
24.	Cynamid India Ltd., Bombay	Malathion 50% EC	1 to 1½ yrs.
25.	—do—	Phorate Tech.	1 to 1½ yrs.
26.	Rallis India Ltd., Bombay	Dimethoate 30% EC	1 to 1½ yrs.
27.	Monsanto Chemicals	Butachlor 50% EC	2 to 3 yrs.
28.	NOCIL, Bombay	Monocrotophos 36% SL	1 to 1½ yrs.
29.	JKBM Ltd., Bombay	Carbendazim 50% WP	2 to 5 yrs.
30.	Travancore Chemicals & Mfg.	COC 50% WDP	2 to 3 yrs.

MANGALORE REFINERY: FINAL CLEARANCE BY NEXT JUNE

The techno-economic feasibility report for the joint sector Mangalore refinery petrochemicals project is expected to be ready by January 1989, according to the State Large Industry and Power Minister, Mr. J. H. Patel.

Final clearance for the project was expected by May-June 1989, he told the State Assembly in Bangalore on Oct. 13, during question time.

He said that the Union Government had approved an expenditure of Rs. 30

red by the company for the preparation of the feasibility report.

The project would require an estimated investment of Rs. 5000 crores including facilities for downstream projects.

It was proposed to acquire 2371 acres for the project. Already 1704 acres of land had been notified for final acquisition under the Karnataka Industrial Area Development Board Act. Acquisition of 666 acres is under consideration.

UP TO GET MORE PESTICIDES

The Central government has arranged for immediate additional supply of

400 tonnes of methyl parathion a pesticide which has been banned both in UK and USA as being harmful to man, to the Uttar Pradesh government for undertaking appropriate plant protection measures in areas affected by the outbreak of armyworm, a crop pest.

The supplies of the chemical were arranged following visit of the Union minister of state for agriculture, Mr. Shyam Lal Yadav, to various parts of the Varanasi division where he reviewed the pest situation in the area.

Since the outbreak of armyworm on a large-scale was observed, the minister sent out a team of experts.

BENZENE SHORTAGE :

Paracetamol units face closure

Several drug units making paracetamol, a widely used analgesic, have shut down in the recent weeks as benzene, a vital solvent required for the manufacture of the drug, continued to be in acute short supply.

The non-availability of benzene has brought down the production of paratrichlorobenzene (PNCB), a penultimate intermediate for paracetamol sharply in the last two months.

Hindustan Organic Chemicals which supplies over 90 per cent of PNCB to paracetamol units in the country could hardly offer 40 per cent of the normal requirements during this period. Production of paracetamol is mostly through PNCB route in India although the drug can also be made through a process involving phenol.

There are over 100 registered manufacturers of paracetamol bulk in the country at present but many of them are in the small scale sector with a monthly production capacity of five tonnes medium and large units are only about 30.

The shortage of PNCB caused by benzene scarcity has already pushed up the price of paracetamol to Rs. 120 per kg in the market now from the level of Rs. 70 per kg a couple of months ago. Industry sources are of the view that the paracetamol price may move up sharply in the coming weeks.

The indigenous production of paracetamol in 1987-88 was about 2500 tonnes whereas the estimated demand for the drug in the current year is 50-30 tonnes. The domestic production in the current year would not be even 3000 tonnes the sources say.

The benzene shortage, started sometime in last July, is mainly because of diversion of substantial part of the production of benzene by Bharat Petroleum Corporation and Indian Oil Corporation, two large manufacturers, to companies making linear alkyl benzene (LAB). Almost 50 per cent of the current monthly production of 13,000 tonnes of benzene is consumed by three LAB manufacturers.

Paracetamol is currently listed in Category I of the Drugs Price Control Order, 1987 along with 25 other price controlled essential bulk drugs. The

drug was not considered as an essential drug in the 1979 DPCO.

Paracetamol has an extremely good export demand from countries in Europe, Gulf and Americas. According to an industry estimate the export could go up to a level of 1000 tonnes a year.

'NEW DRUG POLICY INEFFECTIVE'

The irrational duty-structure prevailing in India on drugs and drug intermediates is a matter of concern to all sectors of the industry. Often there is a higher duty on drug intermediates than on the finished products.

Fortunately, the new policy announced in December, 1986 and the new drug price control order (DPCO) issued in August, 1987 recognises the need to stimulate more investment and production, make the price control system more manageable by reducing the span of control, and give a reasonable return to the producer. However, it is a matter of concern and regret that although

it took seven years to formulate the new drug policy, it has not succeeded even in its partial implementation, according to Mr. Vinoobhai Shah, president of Indian Drug Manufacturers' Association (IDMA).

Mr. Shah has pointed out that although new policies have been announced, old attitudes persist. There is a continuous distrust of the industry which manifests itself in several ways. If the government wants to bring down prices on the medicines, mass production, healthy competition and fair-trade practices are the only answer. The manner of implementation of a policy is even more important than the policy itself.

Mr. Shah has alleged that there is a lot of harassment from the trade associations, who have been holding manufacturers to ransom on the issue of trade margins and other allied problems related to distribution. "We are not against the trade getting their legitimate trade margin. What is deplorable is their unfair trade practice of extorting funds from manufacturers under the pretext of NOC/LOC for introducing a product", Mr. Shah has said.

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US NRI plans HDPE project in Maharashtra

A Rs. 120-crore industrial alcohol project is to be set up in Maharashtra by a non-resident Indian (NRI) based in the USA the state chief minister, Mr. Sharad Pawar, announced in New York.

The project is for the manufacture of high density polyethylene (HDPE) which is used extensively in blow moulded and injection moulded products, tanks and pipes, containers, fibres and as a film and sheet. The raw material used is molasses or alcohol.

The decision on the project was taken on the second day of Mr. Pawar's visit to the US to woo NRI investors. He has already met about 100 NRIs to whom he offered 65 projects estimated to cost between Rs. 50 lakhs and Rs. 100 crores.

The NRI investment in the project is Rs. 12 crores while the Unit Trust of India and the government of Maharashtra will put in Rs. six crores. There

will be a public issue of Rs. 21 crores and term loans worth Rs. 81 crores, Mr. Pawar said.

Mr. Pawar said at full capacity, the project turnover is estimated to be Rs. 150 crores with the state revenue as sales tax to be about Rs. 10 crores. The project would result in large saving of foreign exchange as HDPE will be a substitute for products presently being imported.

He said the project would be located in the sugar belt area, ie., western Maharashtra. The potential for direct employment is about 500 persons but the project is expected to indirectly create jobs for about 20,000 others.

Mr. Pawar said his government had identified 60 places in the 30 districts of the state as "growth centres" and added that potential NRI investors would be given sales tax exemption for a period of six to nine years.

Land, water, power and communication facilities would be given to the NRIs investing in these "growth centres" provided 80 per cent of the non-technical jobs were given to the local population, he said.

MEG PRICES RAISED

IPCL and Nocil, both indigenous MEG (mono-ethylene glycol) producers in the country have once again raised their selling prices.

The price hike this time is Rs. 3,000 per tonne. Both the companies had raised their selling prices by Rs. 1,500 per tonne in August 1988. The new exfactory selling price by Nocil has been raised from Rs. 18,850 to Rs. 21,850 and that by IPCL from Rs. 18,500 to Rs. 21,500 per tonne.

MEG is one of the major raw materials for polyester industry and its supplies from indigenous sources have come down considerably. Its prices in the international markets have shot up to around \$ 1,850 per tonne and supplies are erratic.

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GSFC increases monomer, acrylic sheet prices

Gujarat State Fertilizer Company (GSFC) has increased the price of methyl methacrylate (MMA) monomer and acrylic sheets with effect from October 1.

The polymer division of GSFC has been incurring losses year after year. The company has responded by yearly revision of prices without achieving the desired objective.

After a 12 per cent price rise in April 1985, the company effected another price rise in January 1986 to the tune of 18 to 22 per cent taking advantage of the custom duty revision. In March 1986 price was hiked by another six per cent. Now, a six per cent hike in the price of prime acrylic sheet has been imposed.

The small-scale Acrylic Plastic Products Manufacturers Association has expressed the fear that a number of units may be closed as a result of the latest price revision. There is already consumer resistance due to high cost of end-products attributed to high cost of inputs. Almost 90 per cent of the cost of products is accounted for the raw materials.

This sector of the plastic industry has shown a negative growth. The price increase during the year has been 26.5 per cent in the case of monomer and above six per cent in the case of acrylic sheets. The price of monomer, which was Rs. 36,492 per tonne in December 1987 has now been hiked to Rs. 45,875.

BASF — SINGHANIA COLLABORATION TO MAKE POLYURETHANES

There are 30 Indo-German joint ventures in the pipeline, including a major project between BASF and the Singhanian group to manufacture polyurethane.

Dr. Konrad Seitz, the ambassador of the Federal Republic of Germany in India, told reporters that while final clearance for these projects was being awaited, the German investment in the proposed polyurethane project would be as much as 40 million deutsche marks

The ambassador noted that there had been a tremendous upswing in Indo-German business collaboration over the last few months, with as many as 118 agreements being signed during the eight-month period January to August 1988, far more than with any other country.

The tremendous interest of German industry in India was reflected, he said.

in the Technogerma '88 (held in New Delhi in March) and the subsequent decision of the organisers of CeBIT '89 to invite India to participate in the fair as the major partner.

He however, noted that there was still scope to project Indian expertise in Germany. He cited the instance of the recently concluded agreement between Decassa, Frankfurt, and Vam Chemicals where, "it took two years for the Indian company to convince Decassa that the high-tech process for manufacturing spray silicon could be carried out in India."

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APIDC assurance to HDPE sack units

The Andhra Pradesh Industrial Development Corporation (APIDC) and the State Financial Corporation (APFSC) have assured to look into the specific problems faced by HDPE woven sack industry in the State and extend support to them provided the industry came out with proposals that ensured their viability.

These assurances were held out by Dr. Y. Venugopala Reddy and Mr. A. K. Goyal, vice-chairman and managing director respectively while participating in discussions with members of AP Woven Sack Manufacturers Association (APWSMA). A large number of representatives of commercial banks that extended finance and financial institutions participated in the meet.

Dr. Reddy assured support and urged the industry representatives themselves to come out with concrete proposals seeking assistance.

"We are ready to back you provided that involves activity. I am convin-

ced that the industry, being hi-tech in nature, has a good future."

Dr. Reddy clarified there was precious little the financial institutions could do in the matter of mandatory order. However, the fact that exports have a rich potential and diversification possibilities as well as conversion into polypropylene manufacture being possible, institutions would certainly extend support, he said.

Earlier, welcoming the participants, Mr. Vijay Garg, President of APWSMA, explained that there were 43 units involving an investment of Rs. 60 crores in the State of which 33 were in the small sector. The present crisis in industry was solely owing to external factors beyond the control of the entrepreneurs.

On behalf of the association, Mr. Garg pleaded for rescheduling the term loan repayments with moratorium for two years and reduced interest, funding overdue interest, sanction of additional term loans for balancing equipment for

diversification and increased working capital limits by the banks. Mr. Garg also pleaded that the industry be brought back on rails under rehabilitation schemes.

Mr. Ramesh Jain, President, All India Plastic Tape Manufacturers Association, in his keynote address, traced the travails of industry since 1986 with hefty excise levies and the mandatory jute order. He pointed out that the mandatory order was passed in the wake of bumper jute harvest then but now the situation has completely changed necessitating withdrawal or amendment of the order.

Mr. Tikam Patni, General Secretary, AIPTMA, wanted the commercial banks to stop treating the HDPE units as "untouchables" since present developments were only a passing phase. In fact, the demand was looking up, year after year, and by 1990, even with the mandatory order, the HDPE units would survive. Diversification plans will take time to implement and banks should lend a helping hand to the industry, Mr. Patni said.

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CHEMICAL WEEKLY

FERTILISER PROJECT :

Snam offers joint venture in Gulf

Snamprogetti has offered to put up a fertiliser plant in Bahrain in association with one of the Indian fertiliser companies like the Rashtriya Chemicals & Fertilisers Limited (RCF).

In a proposal sent to the Union government, Snamprogetti has said that Bahrain is interested in utilising its hydrocarbon reserves. For a fertiliser plant in that country, Snam could give the process know-how and provide services and equipment of foreign origin not available in India.

According to a pre-feasibility study carried out by the Italian consultancy firm, the joint effort by one of the Indian fertiliser companies like RCF, and Snamprogetti along with Indian engineering companies would be a formidable one.

However, the pre-feasibility study says that the project is possible only if there is some sort of a buy-back agreement for the produce. The price formula for the fertiliser to be produced in the plant can be worked out in a manner that would be advantageous to India.

Mr. O. Quattrocchi, Snamprogetti's regional director for South Asia, says that ideally India should put up the fertiliser plants only within the country if it has enough feedstock. However, if there is a possibility of the country importing fertiliser for many years to come, then it makes better sense to put up its own plants in some nearby countries which have enough feedstock and with which India has cordial relations.

Gulf countries are best suited in this regard, says Mr. Quattrocchi. These countries have enough gas all over and have very good relations with India. Moreover, the Gulf countries are very near to India which could result in substantial savings in freight.

Enlisting the advantages of setting up fertiliser plants in the Gulf, Mr. Quattrocchi says that Indian labour could be employed there for the construction, operation and maintenance of the plant and Indian engineering companies would be employed to provide detailed engineering for the project.

He says that only equipment which is not being manufactured in India

would be imported from other countries. Though no detailed study has been done, he is sure that the investment cost in the Gulf would be much less than that in India.

With the availability of cheaper gas and with lower cost of the plant, according to him, the production cost of fertiliser in the Gulf would be much less than in India. This could be sold to India as well as other countries to ensure better returns on the investment. The repatriation of the return on investment will, to some extent, cushion the outgo of foreign exchange for buying the fertiliser from the plant, he emphasises.

Mr. Pratap Narayan, executive director of the Fertiliser Association of India, holds different views on the subject. He says that the proposal to set up fertiliser projects abroad may sound logical in phosphatic fertilisers considering the inadequate domestic raw material base and bulk of the produc-

tion capacity in India being based on imported raw materials or intermediates. Adopting the same approach for nitrogenous fertilisers merely on the basis that either the gas available in the Gulf is cheap or investment cost low, is incorrect and undesirable.

The important point is that we have substantial reserves of natural and associated gas capable of supporting our needs for nitrogenous production from within the country. Unfortunately, according to Mr. Narayan, the difficulty arises because it is priced too high. It is nobody's case that we first artificially increase the price charged to fertiliser plants and then argue against setting up of additional capacity in India due to consequential high cost of production, he says.

Mr. Narayan says that equally important is whether the supplies of gas to a plant set up in the Gulf country will be assured at, say \$0.5 per million British thermal units (BTU) which appears to be the main attraction. It is also naive to expect low prices in the other man's land where India's control is negligible. The Gulf countries are

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Last date for receipt of tender is 16.11.1988. The sealed covers are to be superscribed as "Aliquat — 336".

also prone to tremendous political risk leading to a highly volatile economic climate and concomitant uncertainties of pricing.

He says that the overriding economic compulsions call for more industries to be set up in India which would contribute to augmentation of income levels and employment generation so necessary to speed up the growth rate and reduce poverty. The most important question is whether we can afford to assist in the industrial development of other countries as an alternative to our own development, he says.

Mr. Narayan says that even if for argument's sake it is accepted that there are other advantages in setting up a plant in Gulf, the basic point is do we have enough foreign exchange to keep paying for the import of something which can be produced within the country?

INADEQUATE CARGO : INDIAN ACID CARRIERS SUFFERING

India imports millions of tonnes of phosphoric acid. In fact, it is the largest importer of this liquid cargo and still Indian acid carriers keeps suffering for want of adequate cargo.

Although the shipping ministry has favoured the Indian shipping industry's demand for a 40 per cent reservation of the cargo, it has not been able to persuade the Indian Farmers and Fertilisers Co-operative Limited (IFFCO), a public sector unit, to import the cargo on an f.o.b. basis. As a result, Indian shipping companies have been left at the mercy of exporters who exploit the conditions fully.

Shipping circles in Bombay feel that the government should initiate suitable measures and at least partially convert the purchase contracts to ensure gainful employment of specialised Indian tankers.

Chowgule Steamships, which was the first Indian shipping company to introduce in the Indian fleet a phosphoric acid carrier, has to date been suffering either for want of cargo or because of uneconomic freight rates dictated by the exporting firms abroad.

The shipping company's chairman Mr. V. D. Chowgule, speaking at the annual general meeting of the company held in Goa pointed out that a bulk carrier "Maratha Elegance" was converted by the company at a heavy cost into a dedicated acid carrier

in 1983 on the strength of a specific assurance from the fertiliser industry that the ship would have an assured cargo support for a minimum period of five years. Unfortunately, the vessel has to suffer untold problems with regard to its employment.

He said: "Despite being one of the largest importers of phosphoric acid in the world, India is still continuing to import this acid on c and f basis, thus giving the foreign suppliers full liberty in the choice of their tonnage. Under such a system, our ship has to face very adverse and unfair competition and we are often forced to accept uneconomic terms of employment.

COMMODITY PLASTICS PRICES CRASH

Prices of commodity plastics have crashed in the international market. The price fall for various plastics is ranging from 20 to 30 per cent in the last 10 days.

The price of polypropylene has declined to \$1050 per tonne (C.I.F.) now as against a price of \$1550 two weeks ago. The price of PVC resin declined to \$1080 from the level of \$1320.

In the case of low density polyethylene, prices fell to \$1300 per tonne while the price two weeks ago was \$1540. High density polyethylene prices dropped to \$1250 now from the level of \$1450.


Informed sources in Bombay say that price fall is likely to continue in the coming weeks also and all the four major commodity plastics would go below \$1000 a tonne.

The main reason for the sudden decline in the prices of plastics in the world market is the drop in the crude oil prices below \$10 a barrel and consequent distress sales by the stockists.

Stockists in the world market have been holding huge stocks of commodity plastics in anticipation of a steady rise in their prices.

The recent stoppage of large scale buying of commodity plastics by China from the world markets has also eased the market to a large extent, the sources say. The world market prices for the commodity plastics have been steadily rising since last several months.


The crash in the prices of commodity plastics in the world market would be highly beneficial to India which has to import 50 per cent of total requirements of these plastics from various countries, the sources say.



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Acute scarcity of SSP likely

Phosphatic fertilisers particularly single superphosphate (SSP) would be in acute short supply throughout the country in the coming months. It is learnt. Production of SSP has been hit very badly for the last five weeks for want of rock phosphate.

Over 70 SSP units, spread all over the country, could utilise only 30 to 40 per cent of their production capacities in the last five weeks resulting in a production loss of about three lakh tonnes of SSP.

To meet the unusually good demand for fertilisers including SSP this year following a good monsoon the SSP units should have worked more than 100 per cent of their production capacities.

Over 60 SSP units have virtually run out of stock of rockphosphate since the last few days and are on the verge of a temporary shut down. The other units are barely continuing with whatever limited stocks they have.

Industry sources in Bombay say that the crisis has arisen mainly because of the government's failure to import rockphosphate, the key material for the manufacture of phosphatic fertilisers in time.

The Indian phosphatic fertiliser industry needs nine million tonnes of rockphosphate a year. Out of this, only two million tonnes of rockphosphate are available indigenously from Udaipur in Rajasthan and the rest is imported from sources such as Morocco, Tunisia, Jordan and Egypt.

The sources say that although the Minerals and Metals Trading Corporation is entrusted with the import of rockphosphate on a quarterly basis, the import of the material in the second quarter (July-August-September) was negligible.

Incessant rains on the high seas, port congestion and labour problems at the docks had contributed to a sharp drop in unloading operations of imported rockphosphate at the ports.

Another reason responsible for the non-availability of rockphosphate was the wet condition of indigenous rockphosphate at Udaipur because of rains.

Rains have virtually stopped procurement of indigenous rockphosphate during the August-September period.

Production of di-ammonium phosphate (DAP) another phosphatic fertiliser, has not been affected much during the last few weeks, as the main raw material used for its manufacture is phosphoric acid. The demand for DAP however is limited as compared to SSP.

SSP is a preferred fertiliser particularly for cash crops like oil seeds, gram, pulses, etc. Because of the sulphur and calcium contents, DAP is largely used for sugarcane and cereals.

Production of phosphatic fertilisers in the first four months of the current year (April-August, 1988) showed an increase of 30 per cent at 7.25 lakh tonnes as against a production of 5.55 lakh tonnes in the same period of the previous year.

BHEL TO SUPPLY 15 RIGS FOR ONGC

Bharat Heavy Electricals Ltd. (BHEL) has been entrusted with orders worth Rs. 31 crores for the supply of 15 rigs for the Oil and Natural Gas Commission.

The work envisages manufacture and supply of two on-shore drilling rigs capable of drilling up to 4,900 metres and 13 workover rigs used for servicing oil wells. These rigs are scheduled to be supplied during 1989-90 and will be manufactured at BHEL's Hyderabad plant, according to a BHEL press release.

So far BHEL has supplied 46 rigs of various capacities to ONGC and Oil India Ltd. These include country's first desert oil rig deployed near Jaisalmer in Rajasthan and a super deep drilling rig upto 9,000 mts commissioned last year at ONGC's site near Jammu.

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LABOUR PROBLEMS DISRUPT PRODUCTION:

All HFC units to be closed

The Union ministry of fertilisers is understood to have decided to shut down all the four units of the public sector Hindustan Fertiliser Corporation (HFC) till a solution is found to the militant trade unionism plaguing the units for the past several years.

The two operating HFC plants — Durgapur and Namrup — have been closed since September last. The units at Haldia and Barauni are already non-functional.

Frequent interruptions of fertiliser production have resulted in HFC suffering an accumulated loss of Rs. 600 crores. The management blames it on the militancy and indiscipline of the workers while the labour unions hold the defective plants and machinery of the units responsible.

The latest trouble at the Durgapur unit began last month when the workers prevented annual maintenance repairs in the units demanding continued overtime payment even when not involved in the maintenance jobs.

At the Namrup plant, things were going well till the expensive boiler got burnt last month as the operator in charge forgot to switch on the water let-in mechanism. The unions oppos-

ed pinning down of responsibility on the erring operator as, according to them, it was a "routine accident". As a result, production has come to a halt.

While the public sector fertiliser units elsewhere are running at 75 to 80 per cent capacity utilisation and making profits, HFC units have always run at 35 per cent capacity and never shown any profit.

The management has complained that workers gang up and put the plant's units out of action with the sole motive of securing overtime wages or lazing around. It is charged that in the fertiliser bag stitching section machines are always fiddled with so that several fellows could do it manually to earn overtime.

The labour unions in turn claim that many of the HFC plants are ageing and have serious problems of corrosion leading to frequent breakdowns. They also have serious design defects. The management counters this argument by pointing out that a plant of equal age is operating well at the FACT unit at Cochin.

Recently the unions were up-in-arms against HFC chief executive S. Jacob, for reporting to the ministry in a confidential letter that the work culture and

ethos at the units were beyond repair and suggesting induction of managerial leadership in every section from other public sector fertiliser units.

The same view was expressed earlier by the Paul Pothan task force — which examined the ills of HFC — when it recommended that "management culture" would have to be radically modified to run the units on profitable lines.

Foreign consultants, specially appointed by the Centre to revamp these units, have said these units could be fully rehabilitated in three years' time with a fresh investment of Rs. 1000 crores.

It was also pointed out that the HFC units were over-staffed and for economic operations two-thirds of the staff would have to be retrenched with retirement benefits.

But the Union ministry is unwilling to make these investments because of the general resource constraints facing the country and the uncertainties of the labour attitudes at the HFC units. Any amount of investment would not do the job if the unions adopt the attitude of killing the golden goose for narrow personal gains, it is pointed out.

Unless the state governments come forward to help solve these problems, the future of HFC's continued operation remains uncertain.

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HFC closure will cost Rs. 190 Cr.

Close on the heels of the submission of a detailed report based on the recommendations of the foreign consultants on the revival of all the four plants of the Hindustan Fertiliser Corporation (HFC) entailing fresh investment of Rs. 1,100 crores, the HFC authorities have also worked out the financial burden that the Central exchequer may have to bear in the event of closing down all its plants, marketing division, corporate headquarters and other outfits. HFC would require Rs. 190.44 crores for the "golden handsnake" in the event of the Government not dishing out funds for the revival of the Corporation.

It is significant to note that the HFC management — its Chairman and Managing Director, Mr. Sebastian Jacob, in particular — has on many occasions expressed grave concern over the deteriorating labour situation in HFC. It finds labour indiscipline as a major deterrent to the Corporation's commercial viability but the labour problem, according to the experts' study, accounts for only three per cent of the total production loss.

The insiders of HFC look at it as a strange move on the part of the management to make advance preparation to wind up the Corporation as a whole at a time when the three foreign consultants have confirmed the viability and profitability of all these plants. If considered in the light of massive investment that might be required to set up four new plants of the HFC size, the revival package which would cost the Government Rs. 1,100 crores appears to be quite judicious.

Against the backdrop of the revival schemes which have been submitted to the Public Investment Board, exercises like the CMD's letter to the Government condemning the present set of people at the plant level and the compensation package would simply confuse the policy-makers at the Government level, it is felt.

The compensation amount has been worked out on the basis of the manpower position as on March 31, 1988. It shows that for 11,024 workmen, officers, executives and other categories of staffers the Corporation would require Rs. 190.44 crores. The amount obviously would be proportionately higher now than the original esti-

mate as about seven months have elapsed since then. The item-wise compensation break-up is: Rs. 144.69 crores as compensation/ex-gratia payment, Rs. 2.41 crores as compulsory benefit, Rs. 4.23 crores as leave salary, Rs. 24.11 crores as gratuity and Rs. 14.99 crores as retrenchment compensation.

Commenting on the reports about the HFC chief's remarks about the plant level general managers, deputy managers and chief engineers, Mr. M. Rakha, General Secretary of the Fertiliser Officers Federation, said that he is not aware of any such letter. But even if the corporate chief thinks that there are some useless, inefficient executives he should identify them, prove their inefficiency and get rid of them. "We are prepared to give him a free hand to take decisions, but at the same time he must promise that the Corporation would be made viable within a specific time. Commitment must be there from his side also," he remarked.

In the greater interest of the Corporation, its employees and officers, "we also will not object to bringing in experts from outside; but before that the present senior executives' inefficiency will have to be proved. We are quite sure that even if the best brains are inducted, not much improvement could be ensured because the fault mainly lies with the machine and not the man behind the machine. Lurgi, Haldor Topsoe and Toyo Engineering Corporation's reports have confirmed that and that only" Mr. Rakha said.

Mr. Rakha is of the view that there is no other way out than revamping the plants, some of which are pretty old. Till the Government takes any decision on investment, the HFC authorities must take proper steps to boost production to the maximum possible extent. "We will not hesitate to take sides with the Chairman if he could correctly identify the inefficient and useless officers and executives and sack them. But in the name of inefficiency the officers community as a whole should not be implicated. That would be unfair and unjust".

The urgency of revamping of the HFC plants could be gauged by the fact that owing to slippage in implementation of three fertiliser projects

along the HBJ pipeline no decision could yet be taken about setting up of new plants. The additional capacity and production position during the Eighth Plan is still uncertain. Even if a decision is taken now, the additional production may be available only at the end of the next Plan.

Against this backdrop, the foreign consultant's recommendations have opened up an opportunity to get additional production of about 2.5 lakh tonnes of nitrogen from three running units of HFC and 1.5 lakh tonnes of nitrogen and 75,000 tonnes of phosphate from Haldia.

CCL EXCEEDS OUTPUT TARGET IN SEPTEMBER

Central Coalfields Ltd. has achieved 116 per cent of its targeted production during September.

According to an official spokesman, coal production during the period was 20.88 lakh tonnes as against the target of 18 lakh tonnes. The growth rate in production as compared to September, 1987, worked out to an impressive 21 per cent.

CCL also excelled in all major areas of production, productivity, over-burden removal and despatches during the half-yearly period, as compared to that in the corresponding period last year, he said.

Particularly notable was the growth in underground production, which was 3.66 lakh tonnes as against the targeted 3.15 lakh tonnes.

The underground production target during April-September this year was 18.77 lakh tonnes, while the actual production was 20.69 lakh tonnes, the spokesman said.

The removal of over-burden in open-cast mines was 188.90 lakh metres as against 166.29 metres during the same period last year, showing a growth of over 14 per cent.

The half-yearly overburden removal target exceeded by more than 28 lakh metres.

CCL not only achieved the target for the manufacture of soft coke but also exceeded it. The actual production of soft coke during April-September was 2.01 lakh tonnes as against the target of 1.85 lakh tonnes for this period.

Shahjahanpur project may go to NRI again

The government is understood to have decided on Mr. Kaushal Kishore, a non-resident Indian, for the much-delayed Shahjahanpur gas-based fertiliser project.

Knowledgeable sources say that barring some last minute lobbying by other parties, a letter of intent for the project will be issued shortly to Mr. Kishore.

Along with B.K. Pande, another NRI, Mr. Kishore was among the six parties shortlisted for the project which was earlier abandoned by the Caparo group of Mr. Swraj Paul. The other shortlisted parties include the Krishak Bharati Co-operative Limited (Kribhco), the Rashtriya Chemicals and Fertilisers Limited (RCF) and two private sector companies including the Oswal Agro group.

At one time, the Oswal Agro group looked a hot favourite among the decision-makers for the project. But the situation soon changed in favour of Kribhco because of its excellent financial position. Even at this late stage, power-

ful lobbying is going on for allocating the project to Kribhco.

But the government has apparently decided to give the project to Mr. Kishore as he, like Dr. Pande, is understood to have offered to meet the entire foreign exchange requirement of the project. He has also offered to arrange all the funds required for his share of the equity.

However, a section among the decision-makers is strongly of the view that the project should not be given to an NRI in view of the experience with Mr. Swraj Paul who just kept the letter of intent with him while doing nothing to implement the project. They said that the project has been delayed by him so much that cost has gone up by at least 15 per cent.

Kribhco had also told the government that it would be able to put up the project from its internal resources, without any budgetary support.

Kribhco's financial position can be gauged from the fact that it paid dividends amounting to Rs. 13.84 crores for 1986-87 to its member-co-

operatives, including Rs. 10.32 crores to the Union government.

The society has also paid in advance to the government Rs. 90 crores and has liquidated the entire loan of Rs. 79.75 crores drawn from the Industrial Development Bank of India (IDBI) and other financial institutions within three years of the commencement of commercial production.

Kribhco is already executing an ammonia extension project in Hazira with an estimated cost of Rs. 223 crores. The zero date of the project is August 11, 1986, and the completion date is November 1, 1990. The project is reported to be several months ahead of schedule.

Both the fertiliser co-operatives in the country, the Indian Farmers Fertiliser Co-operative (Iffco) and Kribhco, had applied to the government for the Shahjahanpur project. However, the government, instead of giving the Shahjahanpur project to Iffco, allowed it to double the capacity of its gas-based fertiliser unit at Aonla.

THIRUMALAI CHEM PROJECT TO MAKE MALEIC ANHYDRIDE

Thirumalai Chemicals Ltd. (TCL), has commenced work on its Rs. 19-crore project at Ranipet to manufacture maleic anhydride. The plant, located within the existing premises of the company is expected to go on stream by January 1990.

The commissioning of the project will add nearly Rs. 20 crores to the company's net turnover at the full capacity of 10,000 per annum. Maleic anhydride enjoys a strong demand for application in the manufacture of malathion, polyester resins, paints, epoxies and solvents.

Meanwhile, TCL is also investing Rs. 6 crores for modernising its existing plants aimed at energy recovery and improving yields and capacity utilisation.

The work, taken up with the assistance of a specialist consultant in Europe, is expected to be completed by October 1989.

The company is also planning to promote projects based on phthalic anhydride and maleic anhydride.

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PHARMACEUTICALS :

Govt. having second thoughts on loan licensing

After appearing to have taken a firm stand on doing away with the loan licensing system (for the manufacture of pharmaceutical products) in a phased manner, the Centre now appears to be having second thoughts on this issue. This is because the Ministry of Health and Family Welfare issued a circular on September 22 this year that a committee would soon submit a report on this subject.

According to this circular, the Government has appointed a 12-member committee headed by Dr. Prem K. Gupta, Drug Controller of India, to examine the entire issue of the loan licensing system. The committee has been asked to submit its report to the government within a period of two months. The committee will hold its meetings at Delhi, according to this circular.

In this context, it may be recalled that the Government had decided in 1987 to abolish the loan licensing system in a phased manner in order to ensure the adoption of good manufacturing practices (GMP) by the pharmaceutical industry. It was then argued that the loan licensing system had prevented the enforcement or adoption of GMP because the actual manufacturer and the notional manufacturer were not the same when pharmaceutical products were manufactured under loan licences in pharmaceutical units having idle capacities.

The Government's proposal, however, was met with stiff opposition from small-scale pharmaceutical manufacturers, who pointed out that most major Indian pharmaceutical manufacturers had grown large only by beginning in a modest way with the help of the loan licensing system. In fact, pointed out several small-scale pharmaceutical manufacturers, this was the route open to most technocrat manufacturers of pharmaceutical products even overseas. It was only when such technocrats managed to raise funds through the sale of innovative products manufactured under loan licence facilities that they could afford to set up manufacturing facilities on their own, explain small-scale drug manufacturers.

With the Government now deciding to re-examine the issue, small-scale

sector drug manufacturers believe that it won't be long before the system is given legal sanction once again. It remains to be seen if the Government will do so, and if that is the case, whether it will ignore its attempt to encourage the adoption of GMP, or if it will impose some stringent norms on the manner in which the loan licensing is to be used in the future.

APSSIDC CAN IMPORT INPUTS

The AP State Small-Scale Industrial Development Corporation (APSSIDC) has been recognised as a designated agency by the Union Government for bulk import of raw materials under duty exemption scheme of import. As part of its scheme for raw materials assistance to SSI, the corporation would supply intermediate chemicals required for bulk drug manufacture.

Recently a price support scheme was formulated by the State Trading Corporation (STC) to help SSI bulk drug manufacturers in AP up to Rs. 4 cro-

res advance with APSSIDC playing catalytic role by providing ware-housing facilities to manufacturers. Of the 32 manufacturers of sulphamethaxazole and mebendazole, 25 are located in AP and many of them are in SSI sector.

APSSIDC and drug manufacturers will be signing an MoU with STC on the newly formulated price support scheme, a press release from the corporation has said.

SHELL LIKELY TO TIE UP WITH BPCL

Shell International Petroleum Corporation (SIPC), a royal Dutch group company (erstwhile owners of BPCL), is keen on returning to India. It has expressed interest in becoming a joint venture partner in BPCL's next refinery project.

Shell, whose Burmah Shell was taken over by the Indian government in 1976, has already held preliminary discussions with BPCL on the subject. The multinational oil company has already entered the field of offshore oil exploration along the coast of India.

BPCL, however, prefers to remain non-committal on the subject of joint venture partnership.

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Cheaper oil imports throw up new options

The consumption of petroleum products had been increasing steadily in recent years in spite of rising prices in world markets and the policy of the Government to adjust administered prices periodically for discouraging demand and mobilising also resources for development purposes. The prevalence of drought conditions in the past year necessitated larger use of middle distillates, particularly for enabling farmers to use diesel pumps wherever power was not available. The industrial units also had to maximise generation from captive sources which meant larger offtake of diesel oil, fuel oil or LSHS.

In 1983-84, the throughput of refineries was 35.26 million tonnes against an indigenous crude production of 26.02 million tonnes. It was, therefore, necessary to import in that year 15.97 million tonnes as Bombay High crude could not be fully processed by the Indian refineries and 5.52 million tonnes had to be exported. There were also imports for 4.33 million tonnes of petroleum products in short supply. Exports of surplus refined products were, of course, effected for 1.47 million tonnes. Thus, net imports of crude were 10.45 million tonnes and products 2.86 million tonnes.

In 1987-88, the output of crude was only 30.46 million tonnes against the re-

finery throughput of 47.03 million tonnes. Though there were no crude exports, imports were effected for 18.36 million tonnes as there was also anxiety to take advantage of the prevailing lower prices. The quantum of imports of petroleum products in deficit was 3.95 million tonnes or a net 74 lakh tonnes. The value of crude imports was Rs. 2,958.45 crores against Rs. 2,120.19 crores and that of petroleum products Rs. 349.49 crores against Rs. 652.70 crores in 1986-87. The gross import bill was thus Rs. 3,907.94 crores as compared to Rs. 2,772.89 crores. As the exports of surplus refined products fetched Rs. 594.79 crores against Rs. 411.23 crores, the net import bill was Rs. 3,313.15 crores as compared to Rs. 2,361.66 cro-

Rising consumption

The aggregate demand thus improved to 46.70 million tonnes in 1987-88 from 43.66 million tonnes in the previous year. With a static trend in crude output from the onshore and offshore areas, the rise in consumption had to be met with larger imports of crude and petroleum products in short supply. The uptrend in throughput of the refineries will be evident from the details given in Table I.

I : TRENDS IN OUTPUT OF CRUDE AND PRODUCTS

	1983-84	1984-85	1985-86	1986-87	1987-88
	(in million tonnes)				
Crude Production	26.02	28.99	30.17	30.48	30.46
Refinery Crude throughput	35.26	35.56	42.91	45.70	47.08
Refinery Production	32.93	33.24	39.88	42.76	44.01
Consumption of Petroleum Products	35.84	38.80	40.87	43.66	46.70

II : QUANTITY AND VALUE OF IMPORTS

	Q	V	Q	V	Q	V	Q	V	Q	V
	1983-84		1984-85		1985-86		1986-87		1987-88	
Gross imports										
Crude Oil	15.97	3541.05	13.64	3430.34	15.14	3686.80	15.48	2120.19	18.36	2958.45
POL products	4.33	1270.75	6.09	1914.91	3.87	1273.60	3.05	652.70	3.95	949.49
Total	20.30	4811.80	19.73	5345.25	19.01	4960.40	18.53	2772.89	22.31	3907.94
Exports :										
Crude oil	5.52	1231.10	6.48	1563.16	0.53	135.15	—	—	—	—
POL products	1.47	356.96	0.93	255.03	1.96	509.58	2.49	411.23	3.21	594.79
Total	6.99	1588.06	7.41	1818.19	2.49	644.73	2.49	411.23	3.21	594.79
Net imports :										
Crude oil	10.45	2309.95	7.16	1867.18	14.62	3551.65	15.48	2120.19	18.36	2958.45
POL products	2.86	917.79	5.16	1659.88	1.90	764.02	0.55	241.47	0.74	354.70
Total	13.31	3223.74	12.32	3527.06	16.52	4315.67	16.03	2361.66	20.10	3313.15

Q — Quantity in million tonnes

V — Value in crores of rupees

The increase in imports by Rs. 951.49 crores in 1987-88 over 1986-87 was due to additional imports of 2.78 million tonnes of crude and 1.90 lakh tonnes of petroleum products (net) and higher average prices for crude and petroleum products. In 1986-87, the net import bill had declined by Rs. 1,954.01 crores in spite of an increase in the quantity of crude to 15.58 million tonnes from 14.62 million tonnes in 1985-86. Net imports of petroleum products, however, were lower at 5.6 lakh tonnes against 1.90 million tonnes in 1985-86. (Table II).

Since there will be a further rise in consumption in 1988-89, it will be necessary to increase the quantum of imports with no significant improvement in indigenous crude production. The import bill obviously will be higher than in 1987-88 if there had been no decline in world prices. It is difficult to take a definite view in this regard though the recent developments have been in favour of buyers. On account of the competition among the members of the Organisation of Petroleum Exporting Countries to increase their shares of production and exports regardless of the restrictions on individual quotas, prices have nosedived to new low levels.

Since it will take some time for the OPEC members to arrive at a consensus, world prices may be around the prevailing low levels for the near term. The Indian importing agencies should, therefore, take full advantage of the opportunity for securing imports on a cheaper basis. It may be even desirable to maintain larger inventories if it is felt that crude prices are bound to go up from the present low levels. Since the OPEC countries will be anxious to prevent an undue decline in their oil revenues and fresh exploration for locating new reserves is also costly, serious efforts may be made to avoid an undue decline in international prices.

While it will be advantageous from the balance of payments angle to contract the trade deficit with a net reduction of the oil bill, there is also scope for moderating the growth in consumption of petroleum products. The power situation has shown distinct signs of

improvement while there will be reduced demand for energy for carrying out agricultural operations because of the copious rainfall in different regions.

A continuing rise in imports can be avoided only if crude output can be stepped up by at least three million tonnes annually in the Eighth Plan. Natural gas also can be used in larger quantities for producing fertilizers, petrochemicals and liquefied petroleum gas and for power generation in coal deficit areas.

Lower world crude prices can at best prevent a proportionate rise in the cost of imports if the quantum had to be increased because of the incremental output of crude being less than the extra demand. It is needless to say that the depreciating rupee is offsetting to a great extent the advantage accruing out of lower dollar prices. What is more important therefore is a determined bid to raise indigenous production of crude and adopt an integrated energy policy.

— The Hindu

OZONE LEVEL

The ozone level in the southwest of Mexico City has exceeded the world health organisation's acceptable pollution levels.

For the second consecutive day the ozone in the atmosphere in the city registered 262 imeca points. This is one of the highest levels of ozone pollution in the south western part of the city in recent months.

The downtown central section of the city also registered an ozone level of 215 points the same day.

ONGC STRIKES OIL IN SIBSAGAR

Oil and Natural Gas Commission (ONGC) has struck oil in the first well on the Sonari structure located in Sib-sagar district in Assam, according to ONGC sources. The initial testing revealed that the well, drilled to a depth of 4550 metres, had produced oil at the rate of 700 barrels per day and gas at the rate of 20,000 cubic metres per day, the sources added.

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Cause for concern

Says the Financial Express editorially:

It is unfortunate that even before giving a fair trial to the new drug policy announced in December 1986 and the Drugs (Prices Control) Order, (DPCO), issued in August 1987, the Union Government is contemplating to increase the span of price control by including a few more drugs in category 1. This has naturally upset major representative bodies of producers such as the Indian Drug Manufacturers' Association (IDMA) and the Organisation of Pharmaceutical Producers of India (OPPI). The President of IDMA, Mr. Vinobhai U. Shah, has reminded the Government that while issuing DPCO, 1987, it had justified its move to relax the price control and indicated that "the span of control would be further reduced in future in view of the keen competition within the industry." Added to this is the fact that the maximum allowable post-manufacturing expense (MAPE) permitted for category 1 drugs is only 75 per cent. The President of OPPI, Dr. S. Agarwala, has bemoaned the fact that "the MAPE of 75 per cent does not provide a reasonable margin to manu-

facturers in view of the sharp escalation in costs and the higher trade margin payable on price-controlled drugs."

Before increasing the span of price control by expanding the list of drugs in category 1, the Government ought to bear in mind that, while DPCO, 1979, covered drugs which accounted for about 77 per cent of the industry's turnover, the corresponding figure for DPCO, 1987, is estimated at around 73 per cent. In other words, the price control is still fairly comprehensive as far as the turnover is concerned, although the number of drugs under the price control has been reduced inasmuch as while DPCO, 1979, covered 347 bulk drugs and their formulations under three categories, DPCO, 1987, covers 166 bulk drugs and their formulations under two categories. Above all, all drugs selected by the Union Ministry of Health and Family Welfare for implementing the national health programme have been included in category 1. There is, therefore, no need to increase the number of drugs in category 1. Dr. Agarwala apprehends that "by increasing the number of

drugs in category 1 the incentive to produce more will be taken away". As this fear is real, the Government must resist the pressure to increase the span of price control.

PROF. SHARMA IS ELECTED INSA PRESIDENT

Prof. M. M. Sharma is elected president of the Indian National Science Academy for 1989.

Prof. Sharma, who teaches in the department of chemical technology, Bombay University, succeeds Dr. A. S. Paintal, Director-General of the Indian Council of Medical Research (ICMR).

Others newly-elected to the academy council at its annual general meeting are Prof. S. Chandra Shekhar and Prof. P.N. Tandon (vice-presidents), Prof. L.S. Kothari (treasurer), Prof. S.K. Joshi (foreign secretary), Prof. Girjesh Govil (secretary) and Prof. I.S. Bhatia, Prof. D. Chakravorty, Prof. M. V. George, Prof. Goverdhan Mehta, Prof. Ishwar Prakash and Prof. J. S. Singh (members).

Besides, 30 scientists were elected as fellows and six as foreign fellows of the academy.

The new council of the academy will assume office after the annual general meeting in January.

S. GANGULY

The board of directors of Associated Cement Companies have appointed Dr. Subrata Ganguly as Vice-Chairman and Managing Director.

However the appointment is subject to approval of the financial institutions which hold more than 40 per cent share in the company.

Dr. Ganguly is expected to take charge from November 1 replacing Mr. B.K. Banerji who is due to leave by next month. He is the ex-Chairman of Indian Petrochemical Corporation Ltd.

ACRYLATES IMPORT

The Director General of Technical Development has allowed consumers of butyl acrylates to import 40 per cent of their requirement through supplementary licences.

Consumers of this acrylate are already permitted to import 25 per cent of their needs. Import of another 15 per cent was recommended at a producer-consumer meeting held in Delhi.

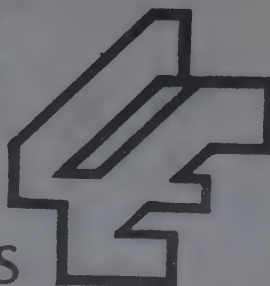
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High protein algae in Indian markets soon

Spirulina, the supernutritious algae from fresh waters and the world's richest source of proteins, will soon be out in the Indian market in the form of multipurpose health food, tablets and capsules.

The specialised algae products, developed and processed by scientists of the Central Food Technological Research Institute, Mysore, would be marketed within a few months by an Indian firm.

These range from the therapeutic capsules and tablets to skin care creams and cosmetics and animal and poultry feed. Spirulina contains a fine blend of nutrients that no single source can offer. Its protein content, the highest known in the world, ranges between 65 to 71 per cent and is three times that of soyabeans and five times that of meat.

The tiny blue-green algae also houses the entire range of vitamin B complex and is the richest vegetarian source of vitamin B12 which is vital for combating pernicious anaemia.

Spirulina is a veritable storehouse of beta-carotene, a precursor of vitamin A, having 20 times more carotene than carrots, and contains high amounts of iron, calcium, phosphorous and trace elements like potassium and magnesium.

With its numerous medicinal values, the algae would be a virtual boon to health care experts looking for inexpensive and nutritious sources to combat the acute problems of protein malnutri-

tion, anaemia and night blindness in the country, according to Dr. T. Somasekhara, a CFTRI scientist.

The high beta-carotene content finds use in curing glaucoma, cataract and night blindness, in Europe and the United States following administration of two to five grams of spirulina per day, CFTRI scientists say.

Spirulina products have also been used as a remedy for pancreatitis, cirrhosis, and hepatitis and act as prophylactic against cancer. In Vietnam, algae tablets are given to increase lactation in nursing mothers and improve their health and immune system.

"Spirulina formulations can reduce blood sugar and cholesterol levels effectively and improve the health of skin," Dr. Somasekhara said.

The algae, in existence since millions of years, are now being popularised as a slimming food in the west. Spirulina formulations help to control obesity by affecting the levels of phenyl alanine, an essential amino acid in the body, and thereby suppressing appetite levels.

They also contain many polyunsaturated fatty acids which help to reduce cholesterol levels in the body on a long-term basis. Ten grams of the plant introduce only 13 mg of cholesterol in the blood and provide 36 calories of energy.

Cosmetic preparations prepared from the spirulina, a rich natural source of vitamin E, have been found to improve the health of skin. When applied on

cuts and wounds, they help in quick healing by promoting cell regeneration.

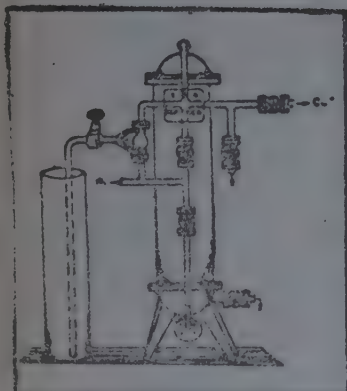
The cosmetics, prepared from the plant's natural blue, green, brown and red pigments, are non-carcinogenic and safe to use, unlike some synthetic chemical preparations. Another class of pigments, known as biliproteins, are used as immunodiagnostics in many laboratories.

Spirulina preparations also provide a fine protein supplement in feeds for poultry, cattle, pigs and in aquaculture for fish, clams, shrimps and prawns.

After ten years of evaluation of the algae's nutritional and other qualities, CFTRI has developed the knowhow and near-ideal conditions for spirulina cultivation in the country, according to Dr. L. V. Venkataraman, a researcher at the institute. At present, the Murugappa Chettiar research centre, has a large-scale production unit at Chettinad, 400 km south of Madras.

The CFTRI technology involves three major steps — cultivation, harvesting and processing. The algae are cultivated by allowing them to bloom in sunlight in a suitable pond whose water is made alkaline and supplemented with certain nutrients and bicarbonates. They are then harvested through efficient separation of relatively small concentrations of algae cells from large volumes of water, using special membrane filters.

Dehydration and drying of the algae mass is another major step which can account for upto 30 per cent of the production. Drying also has a marked effect on the nutritional value of the product.



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PAB clears J. K. Synthetics' proposal

The Projects Approval Board (PAB) has given the green signal to the J.K. Synthetics proposal for setting up a Rs. 900-crore aromatics plant at Saleempur. J.K. Synthetics of the Singhanian group was one of the three contenders for the projects with Reliance Industries and Grasim of the Birla group being the other parties.

According to information available, clearance to the J.K. Synthetics proposal was given on Oct. 4th at a special meeting of the Project Approval Board (PAB).

The Saleempur project will be based on naphtha supplies from the Mathura refinery. It will produce 1,50,000 tonnes of purified terephthalic acid (PTA), one lakh tonnes of benzene and 1,08,000 tonnes of paraxylene per annum. In addition, the plant will make 35,000 tonnes of orthoxylene, 50,000 tonnes of cyclohexane and 35,000 tonnes of return reffinate.

It is learnt that the PAB plumped for the Singhanias because Reliance and Grasim already have huge petrochemicals projects underway.

Reliance, has been selected to set up the Hazira petrochemical complex. Grasim has bagged the Mangalore project. The argument was that as the Hazira and Mangalore projects involved substantial investments it would be better to give Saleempur project to another party.

The project was originally conceived in 1982 and was envisaged for the Seventh Plan period. Now it appears that it will only come up in the Eighth Plan once the Cabinet Committee on Economic Affairs (CCEA) puts its stamp on the PAB approval.

Since Mathura refinery processes Bombay High crude, rich in aromatics, it was decided that the ideal location for setting up the aromatics plant would be Saleempur in Aligarh district, UP. Besides the Saleempur project would be only 80 kms from Mathura refinery.

The project report prepared by the technical consultants of Engineers India Ltd. (EIL) envisaged the transportation of Bombay High naphtha from Mathura to the complex, through a pipeline. The volume envisaged was 400,000 tonnes of naphtha per annum. Interestingly, the original cost of the proposed aroma-

tics complex was Rs. 490 crores. This is now estimated at Rs. 900 crores.

INOX TIE UP WITH AIR PRODUCTS

Industrial Oxygen Company (INOX) which is one of the largest manufacturers of industrial gases in the country has recently entered into technical collaboration with Air Products, U.K. for manufacture of speciality gases in India.

Air Products has agreed to provide INOX with technical and other services to enable it to install facilities for manufacture of speciality gases at INOX's factory at Patalganga near Bombay. These include ultra-high purity (UHP) gases like oxygen, nitrogen, argon, helium, hydrogen with 99.995 per cent purity and speciality gases like sulphur hexafluoride. Besides these, INOX will also be making lighting gases, welding gases, calibration gases and general mixtures of upto 5 components. With this tie-up INOX will be fully geared to meet the requirements of metallurgical, electronic, scientific and research and development organisations in India.

MEXICO'S OIL OUTPUT TO FALL

Mexico's oil production will fall 1.6 per cent this year from 1987, to an average 2.45 million barrels per day, the Energy Ministry reported.

Oil production, which rose to a record 2.74 million bpd in 1982, fell to 2.43 million bpd in 1986, it said. Production rose 4.7 per cent last year.

The ministry's report said income from oil exports in 1988 will fall 20.5 per cent from 1987. Petroleum is Mexico's largest export item, accounting for about 40 per cent of total exports.

Mexico hopes to earn about \$6.74 billion in 1988 from oil exports — 16 per cent less than originally forecast, the report said. The previous estimate was based on an oil price of \$16 per barrel.

Mexico's proven hydrocarbon reserves, which rose from 72 billion barrels in 1982 to 72.5 billion in 1983, fell to 69 billion in 1987. Of that amount, petroleum is estimated to be 54.88 billion barrels.

Mexico, the world's fourth-largest oil producer, is not a member of OPEC but has coordinated its production and pricing policies with the 13-nation cartel in recent years.

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HBJ pipeline to be extended to Delhi

The government is planning to extend the HBJ pipeline to Delhi, Faridabad and other industrial centres in order to supply the natural gas to the industries there, according to Mr. Brahm Dutt, Union minister of state for petroleum and natural gas.

The HBJ gas line has been mainly established to supply natural gas to new fertiliser units and power stations. It is now proposed to set up a string of petrochemical units along the HBJ pipeline, he said.

Inaugurating a seminar on "Petroleum products — quality aspects by 2000 AD", jointly organised by the centre for high technology and Lubrizol India Ltd., Mr. Dutt said natural gas formed a significant proportion of hydrocarbons produced now and in future it would be much more.

The domestic crude production is about 65 per cent of the country's total requirement and it would be the government's endeavour to be self-sufficient in this vital sector in the coming years. A three-pronged approach is adopted to achieve this objective.

The minister said firstly the exploratory efforts by the Oil and Na-

tural Gas Commission and Oil India Ltd. would be intensified to locate oil-bearing areas. It was also proposed to put greater efforts into exploration with assistance from the Soviet Union in selected basins like north Cambay, Cauvery and West Bengal.

Thirdly certain offshore blocks are being leased out to the foreign oil companies on mutually acceptable terms in a bid to bring in capital and expertise. A number of oil finds have been located recently including the one in Krishna-Godavari, and Cauvery offshore structures besides the new structures in Bombay offshore.

Mr. Dutt said the government was also planning expansion of lube oil production facilities in Bombay, Madras and Haldia in view of the increasing imports year after year.

He said there was an urgent need in the country to adopt technologies to process heavy crude oils by the refineries in the context of a decline in the reserves of lighter crude oils. Heavy crude would be abundantly and competitively available in the increasing imports year after year.

Technology changes required in the refineries have thus to be identified and implemented soon to make

Indian refineries efficient to process heavy crudes.

GSI STRIKES HUGE COAL SEAMS IN ASSAM

The Geological Survey of India (GSI) has, for the first time, struck huge coal seams in Hallidaygunj Singrimari in Assam with an estimated reserve of 11.22 million tonnes.

GSI sources said that geologists, in course of their search, found coal-seams having a thickness between four and six metres. The mineral remained buried within a major continental type Gondwana basin.

The GSI is now engaged in analysing the quality of coal, which it expects might boost the backward economy of the area, sources said.

GSI has made a major breakthrough in locating five virgin coal seams in the Pakria sector of Sohagpur coalfield in Madhya Pradesh recently. A total of 98 million tonnes of good quality coal has been estimated in the newly-intersected virgin field.

GSI sources said that the seams, encountered in the Pakaria sector were semi-to-medium coking nature.

This apart, the geologists, in course of regional exploration, have also intersected eight regional and a few local seams with a thickness ranging from 0.51 metres to 13.20 metres in Raigarh coalfield.

Laboratory analysis showed that the coal had low ash content with nine per cent of ash in the lower coal horizon, the sources said.

Ramkola-Tatapani coalfield in Madhya Pradesh also offered new five regional coal seams with thickness varying from 0.58 metres to 12.37 metres. The coal showed a marked improvement in quality with a low ash content of 12.8 per cent, the sources said.

DAMAGE TO WAREHOUSE IN FIRE

A fire broke out causing extensive damage to a warehouse and nearby paddy fields on Thane-Belapur road when some petroleum products of the Bombay-Pune Hindustan Petroleum's pipeline leaked during flushing operations.

According to Mr. Ramakrishnan, H.P. Marketing Manager, the pipeline was being tested and cleared of products and accordingly pressure was built to flush the remains of the products, which have been lying dormant for the last 20 months.

The dropping pressure was noticed in the HP's control room and accordingly flushing operations were stopped.

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More industries may get gas

With the striking of gas at Mandapetta-1, about 25 kms south east of Rajamundry in Andhra Pradesh, a new area of hydrocarbons has come under focus in the northern part of Krishna-Godavari basin in the State.

According to information reaching the Union Petroleum and Natural Gas Ministry in New Delhi, the gas was struck recently when the drilling at a well spudded on March 14 this year by the Oil and Natural Gas Commission (ONGC) reached a depth of 4,302 metres. The well was drilled as an exploratory test well for hydrocarbon prospects in cretaceous sand.

The recent gas find will provide impetus to ONGC's efforts to supply gas to the industrial units in the region for use as fuel. Initially about eight chemical and agro industrial units would get about 1,39,000 cubic metres of gas from this area. In addition nearly half a million cubic metres of gas is to be supplied to Andhra Pradesh State Electricity Board (APSEB) for power generation during 1988-89. The Andhra Pradesh Industrial Development Corporation Ltd. is also planning to utilise the gas for production of ammonia/urea, ethanol and sponge iron.

The Krishna-Godavari onshore is basically a gas producing area. The commercial production of natural gas was started by ONGC with the commencement of supply of 28,000 cubic metres of gas to a paper mill in Bhimavaram in West Godavari district. The gas is being supplied from the wells around Narasapur and Razole through a pipeline laid down by ONGC.

According to informed sources in the next two years the Krishna-Godavari basin will be developed to supply three million cubic metres of gas to various users in the region.

The Seventh Plan programme of Krishna-Godavari basin includes completion of 46 wells (36 onland and 10 offshore); 17,213 slk of seismic surveys (6,075 slk onland and 11,138 slk offshore). A two fold acceleration of activities is planned during the Seventh Plan as compared to the Sixth Plan. An expendi-

ture of approximately Rs. 447 crores is expected to be spent on Krishna-Godavari exploration efforts during the current Plan by ONGC.

The Krishna-Godavari basin encompasses an area of 20,000 kms onland and 21,000 kms up to 200 mts. isobath in the offshore. The prognosticated resources are estimated to be 760 mm of oil and oil equivalent of gas (275 mmt for the onland and 485 mmt for the offshore).

Geoscientific surveys in the Krishna-Godavari basin were started in 1959 and geological, gravity magnetic and seismic surveys were conducted to locate prospects. Common depth plan (CDP) surveys on both onshore and offshore, telexis surveys in the shallow waters were carried out and several prospects were identified.

In addition to the Krishna-Godavari basin, large reserves of gas have been discovered in Bombay, offshore, Tripura and, to some extent, in Rajasthan and Andamans. The chances of finding more natural gas in Jammu & Kashmir and Himachal Pradesh are bright as ONGC is busy drilling some of the deepest wells in this part of the world.

India's natural gas reserves have grown five-fold during the last 10 years and these are expected to increase further. The present level of gas reserves is of the order of 1100 billion cubic metres as on January 1, this year and is expected to go up to 1231 billion cubic metres by the end of the Seventh Plan.

Natural gas is a very effective replacement for naphtha in the fertiliser sector, furnace oil in the power generation sector, kerosene and LPG in the domestic sector, diesel and furnace oil in the industrial fuel sector and in the transportation sector for replacement of the alarmingly growing demand of middle distillates like diesel and petrol.

In the last two year, the use of gas for various purposes in place of oil has helped in saving foreign exchange of the order of Rs. 1,600 crores per annum. This is an indication of impact the use of natural gas can have in the national economy.

MEC DISTINCTION IN MINERAL EXPLORATION

The public sector Mineral Exploration Corporation Ltd. (MEC) has crossed the 30 billion tonne mark in establishing reserves of various minerals.

The 15-year-old corporation by the end of August had established 30,950 billion tonnes of mineral reserves.

The minerals belonged to energy, precious, ferrous, non-ferrous, and non-metallic groups. Established in 257 projects, the reserves are spread all over the country.

The corporation's main emphasis has been on detailed exploration of energy minerals. Reserves of over 17,640 million tonnes of non-coking coal and 5,866 million tonnes of coking coal in 184 explorations have been established.

MEC is currently engaged in a major lignite exploration programme in Tamil Nadu and western Rajasthan. The recently-concluded phase in Tamil Nadu and Pondicherry has established reserves of 3,078 million tonnes.

Also explorations carried out between 1976 and 1980 yielded reserves of 1,482 million tonnes of good grade bauxite, an important source of aluminium metal. The corporation, according to a news release, has played a major role in establishing one of the largest single iron ore deposits at Chiria in Bihar. The total reserves of ore established in Bihar and Karnataka amount to 1,972 million tonnes.

Explorations are also on for copper, lead and zinc ores. Twentyfive projects undertaken since 1973 have yielded 368 million tonnes of lead, zinc and copper ores.

Intensive explorations are also being carried out for gold. So far, the corporation has established 1.82 million tonnes of gold ore.

Reserves of other minerals established by MEC include 64.6 million tonnes of nickel ore in Orissa, 7.2 million tonnes of manganese ore in Madhya Pradesh, 294 million tonnes of limestone and 54 million tonnes of dolomite in Meghalaya, Madhya Pradesh, Andhra Pradesh and Kerala.

MEC has also been assisting other organisations like the Geological Survey of India, Bhilai Steel Plant, Atomic Minerals Division etc.

Oilfield chemicals : imports decline

In a bid to encourage indigenous manufacture of mud chemicals, the Oil and Natural Gas Commission (ONGC) has executed technology sharing contracts with a host of public and private sector Indian companies.

According to ONGC sources 18 contracts have been executed over the past one year or so. Big among them are Balmer Lawrie, Neyveli Lignite Corporation, Rasoi, South Agro Chemicals Ltd. and India Pneumatic.

Out of the 18, the last two contracts were executed last August in relation to two mud chemicals, ferro chromo ligno sulphate (FCLS) and idex (resinex) which were developed at ONGC's institute for drilling technology.

In 1987-88, ONGC's demand for the two chemicals, critical in nature, expensive and imported, was in the region of 5800 tonnes valued at Rs. 2.49 crores. As for the current financial year, the demand has been pegged at 6900 tonnes which, if imported, would incur a foreign exchange outgo of Rs. 2.96 crores.

During 1987-88, the commission shelled out a total Rs. 8.5 crores toward purchase of different types of mud chemicals. In the current fiscal, the bill is expected to soar up to Rs. 10 crores.

Meanwhile, the task force which ONGC set up last year in concert with Chemexil to examine the scope of indigenising the oil field chemicals will make its recommendations by this year end. The task force will also look into ONGC's new product requirements that may emerge as a result of ongoing research in various fields.

The setting up of the task force has been necessitated by the commission's rising expenditure on purchasing oil field chemicals. At present, ONGC spends around Rs. 80 crores a year on such purchase. By the end of the Eighth Plan, it is expected to go up to around Rs. 670 crores.

ONGC's technology sharing arrangement with the various firms is carried out in three stages. In the first one, lab scale knowhow is provided free to the recipient company

with complete technology and other details. Based on the successful completion, a pilot project is put into operation to test the applicability in the field. In the third stage, after quality control tests, the pilot is cleared for full-scale commercial establishment.

Meanwhile, ONGC's existing memorandum of understanding (MoU) with Compagne Francaise de Petrole of France has been renewed. As a result, the two oil companies would concentrate on development of oil fields, exploration, evaluation and seismic surveys.

CSIR RISK ANALYSIS REPORT ON ONGC

Dr. R.P. Mitra, director--general, Council of Scientific and Industrial Research (CSIR), presented the risk analysis report of the Hazira gas processing complex to Col S.P. Wahi, chairman, Oil and Natural Gas Commission (ONGC).

The study, a culmination of six months' efforts by five CSIR laboratories, has identified parts of the complex prone to hazards, predicts frequency of failure of equipment and determines risk potential.

The report suggests measures to mitigate risk, improve general safety and reliability of the complex. It also suggests an emergency plan to deal with emergency situations effectively to minimise damage to human life and environment.

CRUDE PRICES SLUMP

Crude oil prices have dropped to the lowest level since the 1986 oil depression, due to worldwide overproduction.

At the main terminal markets in London and New York, the barrel fluctuates between \$ 11 and \$ 12, that is seven dollars less than the official price set by the Opec. The exporting countries' losses reach tens of millions of dollars a day.

The drop in prices sharpened recently when the international energy agency pointed to the overproduction of oil in August and September, reaching 50.8 barrels per day, the highest level since 1980.

The production increase can be explained, according to oil circles by the difficulties encountered by the Opec in maintaining its quota system. According to the agency the Arab Gulf countries have considerably increased their export with additional 1.1 million barrel per day during the past two months.

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MAHARASHTRA TOPS IN R & D EXPENDITURE

Maharashtra tops the list of States and Union Territories in the percentage distribution of research and development (R and D) expenditure in science and technology. It is closely followed by Uttar Pradesh and Gujarat.

Maharashtra spent 15.11 per cent on research and development, Uttar Pradesh 13.10 per cent and Gujarat 10.22 per cent in 1986-87, according to the latest R and D statistics published by the Department of Science and Technology.

While these three States together incurred more than 38 per cent of the total Rs. 191.86 crores of R and D expenditure during 1986-87, the Union Territories of the north-eastern States of Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Tripura and Sikkim have not spent anything on this during the three-year period ending 1986-87.

The R and D expenditure incurred by most other States was around five per cent.

The State-wise break-up is as follows: Andhra Pradesh (5.58 per cent), Assam (5.52), Bihar (3.57), Haryana (5.22), Himachal Pradesh (1.06), Jammu and Kashmir (1.67), Karnataka (5.00), Kerala (7.73), Madhya Pradesh (4.23), Orissa (1.99), Punjab (5.52), Rajasthan (4.24), Tamil Nadu (6.90) and West Bengal (3.66).

Expenditure on science and technology by various States rose from a meagre Rs. 12.58 crores in 1970-71 to Rs. 258.21 crores in 1986-87. The year-to-year growth rate, however, decreased from 33 per cent in 1982-83 to 19 per cent in 1984-85 and 17 per cent in 1986-87.

Out of the total science and technology expenditure of Rs. 258.21 crores in the State sector in 1986-87, about 74 per cent was spent on R and D activities — basic research, applied research and experimental development.

The State Governments accounted for nine per cent of the total national science and technology expenditure in 1986-87. The science and technology expenditure in States constituted only 0.1 per cent of the gross national product.

Almost 95 per cent of the total expenditure is towards development of agriculture and allied areas. The expenditure in "development of health services" rose from 0.3 per cent in 1984-85 to 1.25 per cent in 1986-87 and in "exploration and assessment of earth, seas and atmosphere" from 0.6 per cent to 1.51 per cent during the period.

The total personnel employed in the State sector in R and D institutions were 42,597 as on April 1, '86. Forty-three per cent of the total were employed for R and D activities and another 43 per cent for administrative support activities. The remaining 14 per cent were providing technical support termed as auxiliary activities.

Of the personnel engaged in R and D, 65 per cent had qualifications in agricultural sciences, about three per cent in medical sciences and two per cent in social sciences.

The figures for engineering services have drastically come down from 28 per cent to nine per cent and increase in agricultural services from 52 per cent to 65 per cent during 1984-85 to 1986-87.

Almost 53 per cent of the personnel with agricultural sciences had post-graduate degrees.

LASERS: MORE LABS SOON TO STEP UP R & D EFFORTS

A string of laboratories will soon be set up in different parts of the country as part of the national mission launched to promote research and development endeavours in the sophisticated field of lasers.

Official sources said that one of these laboratories would be housed in the Centre for Advanced Technology (CAT) at Indore, while the Defence Department had agreed to set up one facility.

These laboratories would take up specific projects and ensure the development and limited production of important lasers. They would also commence programmes in the application of lasers in medicine, material processing, optical data

transmission, computers and communication.

The setting up of laboratories besides establishment of production units and training of man-power in this important area of modern technology was recommended by the Prime Minister's Science Advisory Council (SAC-PM) headed by Prof. C.N.R. Rao to help the country catch up with the rest of the world.

The sources said along with the research facilities, production units would be established to take up the knowhow developed. This would help upgrade the technology with time and meet the export potential.

The SAC-PM had also recommended that some academic institutions be identified to train manpower at the post-graduate and doctorate levels. Special centres should also come up in these institutions to carry out research work in some of the areas identified for the laboratories.

From cutting diamonds, lasers, one of the most important tools developed this century, now have sophisticated applications like probing structure of atoms, detecting pollutants, synthesising chemicals and execution of bloodless surgery. Their unique properties have led to the opening of new frontiers in science and technology—holography, optical communication and optical computers to list only a few.

The advisory council, in its report on lasers, pointed out that not a single laboratory had major programmes in the fields of fibre optics, optical computers, holography and the like. Expertise in these areas was scattered and should be brought together to constitute a core group. It had recommended funds of about Rs. 10 crores over a period of five years for work in these areas.

The status report on laser technology in India has shown that the country was behind developed countries and even developing countries such as China. Optical spectroscopy, the very basis of lasers, has witnessed several important contributions by Indian scientists. However, this good start was not used to the advantage in the laser R and D programmes which evolved later.

GERMANS PIN HOPES ON GENE TECHNOLOGY

Chemical industry managers in West Germany regarded gene technology as a magic word with a wonderful future.

This successful industrial sector headed by the top trio comprising BASF, Bayer and Hoechst, therefore intends in future to defend its leading international positions with new genetically engineered medical preparations.

The world market for this new pharmaceutical field is expected to be worth between \$ 4 and 5 billion by 1995.

However, in their own country the chemical concerns, whose image has taken some bad knocks following growing environmental awareness, face major problems in pushing through their new plans. Fear is spreading of the negative consequences of bacteria with artificially altered hereditary factors, and opposition is multiplying.

On September 1, a new law came into effect requiring that citizens be consulted when permission is being considered for new gene-technological production plants.

The German chemical industry says this regulation will cause delays and competitive disadvantages. The Chemical Industries Association (VCI) complains that the country has the most stringent legal impositions in the world, and has threatened to transfer its factories abroad.

"There is a real danger that in view of the framework conditions in force here, decisions on locations will in future more often favour other countries", said the VCI President, Mr. Helmut Sihler.

The Bayer chemical company has already done just this. Genetic production of factor-VIII, a blood-coagulating agent for bleeders, was passed to the American subsidiary company of Miles, in Berkley, California. Formerly, the agent had to be derived from blood plasma.

Hoechst A.G. also experienced how difficult it is to carry on gene-technology in the Federal Republic. The company has been fighting for years for permission to produce the material 'human-insulin' in its Frankfurt factory.

The hormone, which lowers the sugar level in the blood of diabetics, has so far been manufactured from the pancreas of cattle and pigs. Hoechst now aims to produce it

from bacteria, taking the gene-technology route.

But the opening of an experimental station was frequently delayed by court rulings following objections by citizens committees. Opponents fear that gene-engineered and manipulated bacteria could escape from the plant and change the hereditary formations of other living creatures.

German chemical concerns are anxious to exploit the new possibilities of gene-technology in the coming years, especially in the field of medicine. According to VCI, there are no plans at the moment to manipulate plants or animals.

In this case, it is not easy for opponents to argue against gene-technology. It might perhaps even be possible by means of the disputed process to develop medicines against AIDS, cancer or heart attacks. The sceptics' warnings pale when compared with these hopes.

In 1987, German firms spent about DM 500 million on research into gene-engineering medicines. In Hesse federal state 14 different projects were submitted to the authorities.

TAKING THE HEAT OFF THIN FILMS

Teams at several labs across the U.S. have found ways to make thin films of superconducting yttrium-barium-copper-oxygen at significantly lower temperatures. Although the breakthrough may not have the drama or media appeal of discovering yet another record-setting superconductor, it could have just as much practical importance in the long run, according to a report in Science.

Thin films are the key to what many experts see as one of the most valuable applications of high-temperature superconductors: used in integrated circuits and computers. Since integrated circuits are made by laying down thin layers of different materials and etching those materials in different patterns to form electronic circuits and components, researchers have been working on moulding the high-temperature superconductors into thin films for over a year.

Until recently, the only good superconducting thin films were made on substrates, such as strontium titanate or sapphire, that do not react with the superconducting films at high temperatures.

Now several groups have succeeded in putting superconducting thin films on silicon substrates by lowering the temperatures used in processing. Although the quality of these films is still not as good as those on other substrates; it is improving rapidly as researchers experiment with ways to modify the processing technique.

Despite the success of the low-temperature techniques and the ability to put superconducting thin films on silicon, several barriers remain to practical application. The thin films on silicon still do not have nearly as high critical temperatures as do bulk materials or thin films on other substrates, nor can the films on silicon carry nearly enough current to be useful in most applications, such as interconnects on computer chips.

PLEA FOR IMPORT DUTY CUT ON MEG

Perturbed at the fresh hike in the price of mono ethylene glycol (MEG) by the domestic manufacturers, the polyester yarn industry has urged the Government once again to slash the customs duty on MEG to keep the domestic manufacturers under leash.

Referring to the latest hike in the price of domestic MEG to the tune of Rs. 1,500 a tonne, the Association of Synthetic Fibre Industry, (ASFI), has sent a message to Dr. N. Sen-gupta, Secretary (Revenue), Ministry of Finance, and Mr. H.K. Khan Secretary, Department of Chemicals and Petrochemicals. The indigenous MEG manufacturers were accused of taking undue advantage of the spurt in international price.

Unless the international price rise is proportionately compensated by way of reduction in the import duty which is currently at a level of 90 per cent, the working of the polyester industry will be seriously affected and the indigenous producers of MEG will be continuously jacking up the prices, ASFI has stated.

In view of this ASFI has reiterated its demand to levy import duty on MEG at a specific rate of Rs. 2000 a tonne and urged the Government to take immediate action.

New products

AUTOMATIC SEALING MACHINE

M/s. Patel Machinery Pvt. Ltd., have introduced a fully automatic side sealing and cutting machine which is unique in its concepts for Indian market. The machine is indigenously developed for very specific advantages like no size variation, higher production, low wastage and low maintenance. The machine it is claimed is capable of making LD/LLDPE/HM/HDPE/PP bags plain as well as printed. It has the unique concept of registration of films which does not make use of elements like Clutch-Brake, Rake-Pinion, etc., as normally found in conventional designs. Maintenance is very low because of less number of moving parts as compared to conventional design. Machine is capable of giving Higher Production because of higher Speed. The colour mark scanner (Photocell) fitted on the machine for registration of printed film is extremely sensitive and capable of detecting very low contrasts in colour. Response time of this photocell is so low that there is practically no difference between the speed of the film. This new film Indexing arrangement has a Microprocessor which controls draw length to required size. Draw length can be set easily from panel controls by thumbwheel switch. This new concept registers the film of required draw length. Hence there is practically no Size Variation. Further details can be had from the manufacturers. 5/1/1A, Phase-I, GIDC Vatva, Ahmedabad-382 445.

NEW FILTER

The Sintamatic filtration technology is claimed to be the first major breakthrough in dust control for 30 years. It comes from the development of a dust filter incorporating a PTFE-based coating on high grade porous composite as its filtration medium.

This, unlike its traditional fabric counterpart, is a rigid self-supporting element offering extremely high filtration efficiency. Designed to give complete resistance against premature wear and sudden failure, the elements are exceptionally compact, giving three times more surface filtration area than the conventional fabric filter.

The Sintamatic filter elements are incorporated within purpose designed housing. Constant operation of the filter is ensured by the electronically controlled automatic reverse

jet cleaning system—a development of DCE's Dalamatic continuously operating filter system, already used in over 100,000 filters worldwide. Collection efficiency is such that effluent concentrations are reduced to levels eliminating the need for secondary filtration.

The elements are manufactured from high grade engineering composites in a process incorporating the latest robotic and microprocessor technology. A carefully controlled blend of granulated engineering polymers is dimensionally restrained and then subjected to process to produce a rigid, porous composite element.

To ensure maximum filtration capacity properties, the surface of the element is impregnated with a PTFE-based solution to form a microporous skin. This creates an element that is a highly effective barrier to all dusts, has high mechanical integrity and is resistant to most chemicals.

The technique used to apply the coating allows the PTFE-based material to migrate into the porous element surface. Consequently, miniature perforations, which may occur due to abrasion, will not effect the overall performance in the same critical manner as occurs with a flexible fabric/membrane laminate where the result may be excessive dust release through the filter, followed by plant shutdown and high maintenance costs.

The producer (DCE Ltd., Humberstone Lane, Thurmaston, Leicester, United Kingdom. LE4, 8HP), says the rigidity of the Sintamatic element ensures greatly improved cleaning efficiency; 100% of the air pulse energy is used to remove the dust cake rather than being absorbed by bag or cartridge deflection—a characteristic of traditional filters.

The Sintamatic series SU range dust control units are for process applications requiring air volumes in the range of 800 m³/h to 8000 m³/h. The filter is available in six basic sizes of filtration area, with or without fan, and each unit can be supplied with either a hopper to accept a rotary valve or with an integral dust container.

Alternatively, by using the filter and fan sections only, it can be fitted directly on to a purpose-built storage container or be integrated into the process machinery.

For hygienic or other high specification application. The Sintamatic is available with high grade

stainless steel components. Typical applications include mixers, mills, sieves, packing machines, powder spraying, tipping and conveying.

BINDING AGENTS, PIGMENTS AND AUXILIARY MATERIALS FOR PAINTS AND TONERS

Since the 1987 Resins & Pigments Exhibition, Degussa AG of Frankfurt am Main, Federal Republic of Germany, has added several new products to the range of products it supplies to the lacquer and paint industry.

The various binding agents, comprising thermoplastic methacrylate resins (marketed under the name Degalan), aqueous pure acrylate dispersions (marketed as Degalex) and cationic ultra-violet hardened epoxy resins (marketed as Degacure), now includes three further Degalex types and toner resins.

Degalex EM 170 is used in high-quality facade and concrete protection paint formulations and is weather-resistant, with good water-vapour diffusion properties and low moisture absorption. It is also suitable for the manufacture of wood glazes and wood lacquers.

Degalex VP-EM 174 is recommended as a binding agent for pro-environmental aqueous parquet flooring lacquers. Lacquers manufactured with this substance have particularly high abrasion resistance.

Finally, Degalex VP-BF 50 has been developed for block-resistant high-gloss dispersion paint formulations. The particular advantage of these dispersions are excellent adhesion to old, non-sanded alkyd resin bases and equally good wet-adhesion properties.

The new toner resins are suspension polymers with a styrene and acrylate resin basis and monomodal or bimodal molecular weight distribution. They possess good tribo-electrical properties and are suitable for use in the manufacture of powder toners fixed by heat or by heat and pressure. In view of their highly brittle nature below the glass transition temperature, the new Degussa resins can be easily processed by the conventional grinding and classifying methods used in the production of toners. By varying the monomer composition, the technical properties of the resins can be adjusted in accordance with clients' specific technical application requirements.

The Degussa range also includes pigment carbon blacks, pigment carbon-black dispersions, inorganic coloured pigments, silicas and silicates.

ICC plea to redefine monopoly

To encourage Indian firms to grow in size and become large enough to compete with the multinational corporations, the Monopolies and Restrictive Trade Practices Act should be rewritten to define monopoly in terms of market share and delete all references to size of assets and restrictions imposed on firms crossing a certain size.

In a background paper on "impact of policy liberalisation" the Indian Chamber of Commerce (ICC) has pointed out that no-where in the world had any Government tried to define monopoly in terms of size of assets. There existed many cases of firms of assets over Rs. 100 crores enjoying a very small market share.

Instead, legislations on the lines of the anti-trust laws of the US, Europe and Japan would be more relevant in this country.

Reflecting industry's efforts to have it their way all along, the chamber pleaded that not only should there be delicensing but there should not be any need for clearance either.

The Government should lay down norms for such aspects as pollution control, capital goods imports and foreign collaboration and entrepreneurs would be expected to follow these guidelines on their own.

Mentioning that the industrial policy was still biased against the large houses, the paper went on to add that any further policy changes would have to include removal of all discretionary control reflected in the systems of clearances, changes in

labour laws facilitating modernisation, lowering of interest rates, duties and taxes to bring down input costs and scrapping of curbs on technology imports.

Also, the policy makers should take measures to expand the domestic market which is necessary to absorb the incremental output arising from faster growth, define priority sectors in regard to bank finance which should be flexible so that projects could be appraised on case-by-case basis and boost the capital market and spread the equity culture.

Since industrial restructuring through closures, mergers, amalgamations and labour rationalisation is not possible without changes in the labour laws, the Chamber suggested that a statutory fund be created to finance retaining and rehabilitation of the workers rendered surplus through the modernisation process.

Alternatively, a statutory unemployment insurance scheme could be introduced on the lines of the Employees State Insurance scheme.

Standard norms should be laid down to link wages to productivity, the paper suggested.

Monopoly redefinition ruled out

The Industry Minister, Mr. J. Venegal Rao, has declared that "there is no going back on liberalisation" and indicated that future licences to large industrial houses would be linked to exports.

At the same time, he rejected the oft-repeated plea that monopolies should be defined in terms of market share and not on the value of assets.

Such a change would virtually mean abolition of criteria of asset threshold which has been prescribed to distinguish such companies from a company dominant in market share as laid down under the MRTP Act, he said.

Mr. Rao emphasised the need for measures to increase exports 'by all possible means' and outlined a three-pronged strategy which is being worked out for this purpose.

Mr. Rao was emphatic that the Government is carrying out liberalisation measures according to a coherent strategy. 'Liberalisation is a continuous process and cannot possibly be reduced to a one shot operation.'

The Industry Minister said each of the measures announced by the Government is of a substantive nature and is designed to subserve the overall strategy.

Explaining the Government strategy in this regard, he said it was aimed at accelerating industrial growth, modernising and upgrading the technology and enhancing the competitiveness of the industry.

The measures taken by the Government, whether of minimising unnecessary micro level controls or of providing incentives for techno-

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logy upgradation and exports, fit into this strategy, he said.

Mr. Rao said the large industrial houses must play their part in stepping up exports. So far the performance of the large houses has been rather poor on the export front.

Apart from exhorting the large houses, the Government has refrained from imposing compulsory export obligations on them. However, a stage has now come when steps have to be devised to ensure that the large houses do not depend heavily on the Government for their foreign exchange requirements and meet them through exports, the Minister said.

Outlining the three-pronged strategy being worked out in this regard, Mr. Rao said firstly, production for the export market must be made more attractive than for the domestic market so that the 'lure' of the domestic market does not come in the way of exports.

Secondly, the base of industrial production, its cost and quality competitiveness must be upgraded so that export-worthy products are produced at internationally competitive prices.

Thirdly, they should be required to generate, as far as possible, their own foreign exchange or encourage foreign exchange earnings by others for the import of their requirements of capital goods, components and raw materials. The steps being taken by the Government encompass all these areas, Mr. Rao said.

Referring to the oft-repeated demand that monopolies be defined in terms of market share and not in terms of value of assets, Mr. Rao ruled out any such change.

Mr. Rao explained that the line the Government has taken is that this would virtually mean abolition of criteria of asset threshold, the provisions of the MRTP Act relating to the prevention of concentration of economic power to the common detriment require to be preserved.

Mr. Rao said it is not correct to say that there has been no matching response under the MRTP Act in relation to delicensing and other measures initiated under the I (D & R) Act.

He pointed out that recently a series of liberalisation measures have been announced by the Government in respect of MRTP companies. These are:

The asset threshold which brings a company within the ambit of the

MRTP Act has been raised from Rs. 20 crores to Rs. 100 crores.

The list of industries which are normally open to MRTP houses has been expanded considerably with the result that the MRTP houses have now larger options to plan and execute their industrial schemes.

Mr. Rao said another measure of liberalisation was that a wide range of industries of high national priority, have been exempted from the operation of the MRTP Act in so far as the proposals relate to either establishment of new units or substantial expansion of the existing ones.

Any proposal from the MRTP company which is meant exclusively for 100 per cent export outside the country is also exempt from the operation of the MRTP Act.

Schemes such as broad-banding, re-endorsement of capacity, fuller flexibility in the use of fibre by textile industry, minimum economic

scale of operations and maximisation of industrial production have been announced.

To deal with these proposals a simplified procedure has been notified under the MRTP Act and proposals are cleared with a fast track approach, he said.

Mr. Rao said the main objectives of measures taken in the field of industrial licensing are — increasing industrial production, improving the quality of industrial products and making them competitive both in the domestic and international market.

"Our aim, therefore, in the coming months should be to ensure that these objectives are achieved", he said, adding that this would require constant and continuous attention to induction of new technology, promotion of modernisation measures and upgrading the standards of the products. "It is to these that we have to give more attention", Mr. Rao said.

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Green channel for SSI's

A green channel clearance facility has been introduced in Tamil Nadu to expedite the setting up of small units with a capital investment of less than Rs. 10 lakhs.

The facility will obviate the need for the entrepreneurs to obtain prior clearance from various regulatory agencies. Instead, the agencies will give "expost facto clearance", in accordance with rules, on intimation from the units.

The State Governor, Dr. P.C. Alexander, said the new concept will, however, not be applicable to industries classified as highly polluting by the Pollution Control Board.

He said the single-window agency system at the district-level has been revamped and the DICs are now made responsible for obtaining clearances for the units. In order to further improve the working of the centres, steps are being taken to ensure spot clearances for building plan approval, pollution control, regulations and power connection.

From the long-term point of view, the Government has identified three industries in the small sector — food processing, automobile ancillaries and drug and pharmaceuticals — as thrust areas. New units in the group as well as those going in for expansion/diversification involving capital outlay of not less than Rs. 10 lakhs will be eligible for a capital subsidy of 20 per cent subject to an annual ceiling of Rs. 10 lakhs.

They will also qualify for a higher quantum of sales tax deferral up to a limit of Rs. 20 lakhs with an annual ceiling of Rs. 5 lakhs.

To encourage the adoption of new technology of R & D-based activities in the SSI sector, the Tamil Nadu

Industrial Investment Corporation (TIIC) will provide assistance at a concessional interest of 10 per cent with minimal promoter's contribution and also a subsidy of 25 per cent of the cost of acquiring technology subject to a maximum of Rs. 50,000 for proven knowhow.

The scheme is intended to encourage setting up of small units based on new technologies and process evolved by the national and State-level research laboratories and technical universities.

TIIC will offer a reduction of one per cent in the rate of interest on prompt payment of dues.

With a view to providing marketing support to the units, the State-owned Tamil Nadu Small Industries Development Corporation (SIDCO) will hold regular buyer-seller meets and take part in industrial exhibitions with a consortium of units.

The corporation will also post a liaison officer in Delhi for better dissemination of information on DGS & D purchases and to effectively improve the State's share which is very low now.

The other State-owned Tamil Nadu Small Industries Corporation (TANSI) will throw open its showrooms to willing SSI units for marketing their products on negotiated terms and conditions.

EVALUATION OF TENDERS ASSOCHAM MOOTS NEW SYSTEM

The Associated Chamber of Commerce and Industry (Assocham) has suggested formulation of a rational and foolproof system for evaluation of tenders by government purchasing agencies to ensure quicker deci-

sions and elimination of corrupt practices.

In a note on government purchases to the director general of supplies and disposals (DGS and D) working group, Assocham has stated that the system should not only give prime weightage to the prices but also to other important factors such as quality of goods, special features incorporated in a product, supplier's reputation and after-sales service. Also once the systems is finalised, it should be adequately publicised.

Referring to registration of firms for the supply of products, the Assocham note said at times offers of untested and untried new consumable products from new manufacturers or suppliers are accepted on lowest quotation basis. This leads to inferior quality or elimination of reliable products.

With formalised system of registration, a large number of registered firms are available. There is, therefore, hardly any need for considering unregistered firms. New suppliers may be registered after they have completed at least five years of their existence and have attained a reasonable reliability for effecting supplies.

Also, the concerns which have continuously defaulted in the execution of tenders in the past should not only be delisted but also their fresh registration in new garb be disallowed.

Stressing the need for spelling out the basis for the buying decisions so as to avoid any ambiguity, Assocham has favoured clear mention in the tender documents whether the lowest quotation would be accepted or the final price would be determined after negotiations.

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RBI announces new credit policy

Withdrawal of credit authorisation scheme (CAS), introduction of inter-bank participation certificates, fixing a minimum lending rate of interest at 16 per cent and allowing transfer of borrowal accounts, and lending under consortium arrangements were some of the major decisions taken by Reserve Bank of India while announcing credit policy for the busy season.

While withdrawing the present system of prior authorisation for sanction of working capital credit limits/term loans, RBI made it clear that all proposals involving sanction of aggregate working capital limits beyond Rs. 5 crores (instead of the present limit Rs. 2 crores) would be subjected to post-sanction scrutiny by RBI to ensure that the basic discipline were met with.

As far as term loans were concerned RBI stated that all proposals which were currently required to be referred to it for its prior authorisation, would henceforth be subjected to post-sanction scrutiny. On finding that any particular bank had enforced the basic disciplines, RBI may instruct such bank to refer large cases to it for prior authorisation.

The basic discipline here was to ensure that bank credit for large borrowers does not make a disproportionate draft on the lendable resources of banks to the detriment of other borrowers.

With a view to providing some relief to borrowers with good credit record and also to provide flexibility to banks on interest rate, it has been decided to do away with the ceiling stipulation on interest rate, which is currently prescribed at 16.5 per cent, while prescribing a minimum lending rate of interest at 16 per cent.

However, banks have been advised to use this discretion to charge differential rate of interest judiciously.

In order to provide an additional instrument for ironing out short-term liquidity within the banking system, inter-bank participation certificates have been introduced, strictly confined to scheduled commercial banks.

This inter-bank participation certificates, popularly known as PCs, is of two types: PCs with risk sharing and PCs without risk sharing. PCs with risk sharing, which would provide flexibility in the credit port-

folio of banks, would be issued for 91-180 days whose rate of interest rate was to be determined between the issuing bank and the participating bank while subjecting to a minimum of 14 per cent per annum. PCs without risk sharing, a money market instrument whose tenure should not exceed 90 days, will carry an interest rate that would be determined between the two concerned banks while subjecting to a ceiling limit of 12.5 per cent per annum.

Regarding transfer of borrowal accounts and lending under consortium arrangements, it has been decided that all parties, including those enjoying aggregate credit limits in excess of Rs. 5 crores, should be free to transfer their accounts from one bank to another without the requirement of a 'no objection' letter being given by the existing bank. However, the transferee bank will have to take over the entire liabilities of the party.

So far as consortium advances are concerned, the existing restriction limiting the number of banks to five in respect of credit limits up to Rs. 50 crores was being removed. However banks have been advised to limit the number of participants in formal consortia to around 10.

That apart, RBI has decided to allow the Discount and Finance House of India (DFHI) to participate in the call and notice money market both as a lender and a borrower. This step, with effect from July 28 this year, means that DFHI would not be subject to the provisions of the ceiling on the rate of interest set by the Indian Banks Association (IBA).

Besides, this would result in a limited freeing of the call money market rates.

Further the RBI Governor, Mr. R. N. Malhotra, while addressing the chief executives of scheduled commercial banks stated that although the overall growth of liquidity (M3) during the first half of the current financial year amounted to Rs. 11.176 crores registering a 6.9 per cent growth last year, the rate of growth of M3 in the current year has been of the same order as last year. This, he observed, is despite a much faster deposit growth as currency expansion in the current year had

been subdued besides being moderated by the substantial decline in net foreign exchange assets.

Stating that he had indicated earlier during the year a working estimate of deposit growth of Rs. 20,500 crores for 1988-89, Mr. Malhotra maintained that deposits during the full year would increase by that amount and banks may continue to plan their credit operations on that basis. According to him, the focus of credit policy for the next six months is to meet effectively the increased credit needs of various sectors of the economy and thereby support the expected recovery.

At the same time, as was expected, RBI made no changes in the cash reserve ratio (CRR) and statutory liquidity ratio (SLR).

PASSBOOK SYSTEM FOR KITS IMPORT

The Union Government has decided to introduce the passbook system for importing equipment, spares and consumables for scientific research.

Under the passbook system public-funded research institutions are entitled to import equipment and spares up to an aggregate c.i.f. value of Rs. 1 crore annually.

Consumable goods up to an annual c.i.f. value of Rs. 50 lakhs will also be covered by the system.

The pass book, however, will not cover the import of any single equipment, instrument or spares the c.i.f. value of which exceeds Rs. 5 lakhs. In the case of consumables also, the aggregate c.i.f. value of any single item should not exceed Rs. 5 lakhs annually.

The Department of Science and Technology (DST) will be the nodal agency which will issue passbooks to all the public-funded research institutions. For universities, the nodal department will be Department of Education.

The scheme, according to an official press release, is applicable to universities and those research institutions in the case of which not less than 50 per cent of recurring expenditure is met by the Union Government, State Government or Urban Territory.

The institutions which wish to avail of the facility will have to submit details of their requirements to DST in the prescribed proforma.

Company Notes

URANIUM CORPORATION

The Uranium Corporation of India has made an all-time high profit of Rs. 28.14 crores, registering an increase of 37.4 per cent over the previous year's figures, a statement from the Department of Atomic Energy said.

During the year under review, three on-going projects were completed — the capacity of the processing plant expanded by 37 per cent in November, the project for production of finer size and higher grade magnetite commissioned in March and modernisation of the uranium recovery plant completed at Surda and recommissioned in March 1988 the statement said.

Work has since been completed on the expansion of the uranium recovery plant at Mosabani, test work on recovery of uranium from ultra fine particles stepped up and progress made on the shaft sinking stage (III) project in order to mine the ore 550 metres below surface, the statement said.

Implementation of the scheme for upgradation of affluent treatment systems is likely to be completed by the end of 1989, it added.

The company had since received clearance from the Ministry of Environment and forests for the Narwapahar and Turamdih projects, the statement said. Meanwhile preliminary work at the project sites are being continued.

The Atomic Energy Commission has approved preparation of a detailed project report on Bodal uranium deposit in Madhya Pradesh and the work will be taken up shortly. The next uranium deposit for

and a feasibility report on opening this deposit is under preparation.

With the enhanced capacity now available in the mill it is expected that the production of uranium concentrates during 1988-89 will still surpass the existing figures. The power-supply position has become more stable with the commissioning of a 132 kv grid sub-station by the Bihar State Electricity board at Jaduguda.

MEHER PHARMACEUTICAL (INDIA)

Meher Pharma (India) has secured substantial orders worth Rs. 2.5 crores for exports. The company has also entered into a technical collaboration agreement with a reputed overseas group to manufacture and market internationally reputed products.

The collaborators have agreed to buy back 50 per cent of the company's products manufactured under the technical collaboration.

To finance the modernisation, technical upgradation and the expansion programme of the company, the directors propose to issue 1,31,250, 14 per cent redeemable convertible debentures of Rs. 160 each amounting to Rs. 2.10 crores on rights basis in the proportion of 10 debentures for the existing 100 equity shares.

EIP RESINE

EIP Resine Limited, the Madras-based company, has declared a maiden dividend of 18 per cent payable pro-rata from the data of allotment, for the year ended April 30, 1988.

During the first year of operations, the company's performance was satisfactory. The profit before tax stood at Rs.

99.30 lakhs and the net profit at Rs. 33.01 lakhs. Depreciation and interest charges accounted for Rs. 9.68 lakhs and Rs. 49.11 lakhs respectively. The equity dividend absorbs Rs. 6.76 lakhs. A sum of Rs. 4 lakhs has been transferred to the general reserve.

The main product of the company is epoxy resin systems mainly consumed by the paint industry, including protective coatings. It is stated this product is in demand by civil and light engineering industries.

The company has started its own R and D division at its works in Ranipet to meet the exacting quality requirements of its customers.

The outlook for the current year, according to the company's press communique, is bright. The rising cost of production has been attributed to import of raw materials and the fall in the value of rupee.

ULTRAMARINE AND PIGMENTS

The sales of Ultramarine and Pigments during the first five months of the current year amounted to Rs. 342 lakhs including Rs. 135 lakhs from export against Rs. 333 lakhs during the corresponding period of last year including export earning of Rs. 79 lakhs.

Besides, the company has earned during the period Rs. 28 lakhs as processing charges against Rs. 11 lakhs. The company expects to earn substantial amount as processing charges during the current year, according to Mr. N.S. Iyengar, Chairman of the company.

Addressing shareholders at the company annual general meeting, he said that the company hopes to increase the production and sales of HDPE woven sacks during the current year.

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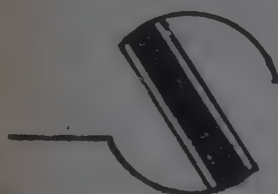
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Highlights in Chemical Technology (Part 2)

A LOW CAPITAL H₂O₂ ROUTE UNVEILED BY DU PONT

Du Pont (USA) has recently announced a direct process for hydrogen peroxide from hydrogen and oxygen -- something of an industrial North-West Passage. The patented process involves a proprietary catalyst and reaction system.

Hydrogen peroxide is currently produced industrially by the autoxidation of alkyl anthraquinone and hydrogen. Du Pont reports that the new process will require much lower capital investment due to the reduced number of operations required. Savings up to 50% have been quoted. The process would also be suitable for small scale production and Du Pont appears to be targeting the paper and water treatment industries for early sales.

In the Du Pont process, hydrogen and oxygen react in the presence of a platinum metal catalyst and halide ion within an acidic aqueous environment. This route has been attempted for years, Du Pont's success has come in the development of a catalyst which produces satisfactory hydrogen peroxide yield and product concentration.

Interox, Du Pont's rival gave the Du Pont process a mixed reception. While accepting Du Pont's claim to a process requiring low capital cost, Interox felt running costs could be higher, particularly in energy demand. In comparison, the quinone process has become very efficient and had a very low running cost. Interox also believes product concentration from the new process to

be around 20% which would require further concentration for industrial use.

Safety is another risk highlighted by Interox. Contacting hydrogen and oxygen carries obvious explosion risks which could outweigh the benefits of the new process. However, Du Pont was quick to counter this, pointing out that its reputation for safety is well known and that the company would not build a plant if it did not consider the process safe. (*Process Eng.*, 3/1988, p. 25).

BIODEGRADABLE POLYMERS POISED FOR GROWTH

The plastics industry is actively seeking practical and economic ways of addressing plastic disposal and easing the burden on the environment. The technologies being pursued include recycling and the development of degradable plastics.

Most bulk polymers are relatively resistant to attack by microbial enzymes and will not biodegrade. Very low molecular weight forms of polyethylene are broken down by microorganisms but similar forms of polypropylene and polystyrene remain intractable. A few synthetic materials do biodegrade slowly -- polyvinyl acetate, polyamides, polycaprolactone, polyethylene adipate, and there are claims for polyurethane and nylon.

Bacterial species capable of aerobic attack in a variety of synthetic polymers have been isolated in recent years. It would be possible to improve the biodegradative powers of these agents by applying other established selective techniques.

One could imagine effectively composting certain plastics and other susceptible materials by inoculating landfills with consortia of selected microorganisms.

The inclusion of biodegradable additives to traditional polymers can cause plastic articles to breakdown under microbial attack. Relatively large concentrations of additives are required and degradation again leads to a disintegration of the structure of the plastic article but not the polymer itself.

While there is no evidence of flexible PVC being offered as a biodegradable system, starch filled PVC, polyethylene and poly (ethylene co-acrylic acid) are commercially available.

One novel group of polymers under development by ICF claims exciting new products in the field. The family of polymers is referred to as PHB-poly (hydroxy butyrate) and PHBV -- poly (hydroxybutyrate-valerate), and is a natural, aliphatic polyester produced by bacteria and algae.

PHBV has been successfully and injection blow molded, extruded and solvent cast as film, and melt and solvent spun into fibers. Applications under development for the food industry include packaging for bottles, trays, calendered and oriented thin film.

There are a number of ways under intensive study to introduce the property of degradability into the established group of thermoplastic polymers. Each degradable system will have its strengths and weak-

nesses. To date, use of available system had been limited by performance, price and perceived need. However, with growing demand for such products arising out of changing attitudes and laws, development will be accelerated, established products improved and new ones introduced to meet the requirements of an emerging market. (Abstracted from the report 'Degradable Polymers' by D. Roger Lloyd, ICI Biological Products Business, ICI Americas Inc.).

FIBRES OF HIGH TEMPERATURE SUPERCONDUCTORS DEVELOPED FOR THE FIRST TIME EVER

Scientists at Stanford University in California are the first to make fibres out of the recently discovered high temperature superconductors.

The research team grew the fibres, which are between a quarter and 1 mm in diameter, to study the properties of materials. Their first fibres are only 4 cm long but they hint that they may be able to produce long superconducting 'wires'.

The superconducting fibres made from Bi-St-Ca-Copper oxide reached zero resistance at 85°K. Robert S. Fergelson and his colleagues at Stanford say the fibre can carry at least 30,000 amperes per sq. cm. at 4°K.

The Stanford group grew its bismuth fibre with a laser heating technique developed for optical materials. A beam, from an infra-red carbon dioxide laser melts the top of a rod of the superconducting ceramic.

The molten superconductor is crystallised on a 'seed' crystal, which is then pulled to form the fibre. (*New Sci.*, 6/9/88, p. 50).

AN AGGLOMERATION PROCESS TO RECOVER ENERGY IN WASTED COAL FINES DEVELOPED BY NRC (CANADA)

An agglomeration process to recover the energy in wasted coal fines from coal cleaning operations was unveiled by the National Research Council of Canada (NRCC) (Ottawa) at the Powder Show. The newly commercialised route is embodied in a \$1 million, 30-40 ton/hour unit located at a Pennsylvania coal clearing facility and produces coal fines agglomerates for about \$6.50-11/ton.

NRCC researchers point out that coal fines typically are unused because they present a problem in handling and transport. Fines agglomerated with oil, on the other hand, have an increased energy content (because of the oil), reduced dusting characteristics and lower moisture levels. Earlier agglomeration techniques, were too costly because of the large amount of oil needed (greater than 10 wt%). Using a proprietary mixer that better disperses the fines through oil than did previous methods, the new route requires only 1-7% of oil. (*Chem. Eng.*, 5/23/88, p. 19).

A UNIQUE MODE OF RESEARCH BY GUEST SCIENTIST INAUGURATED BY NBS IN USA

The National Bureau of Standards (NBS) of USA has evolved a unique mode of research between industry and academia to work with the NBS to develop measurement tools needed by manufacturers of high-performance plastics, polymer blends and advanced composites.

Specific areas to be developed are sensors to monitor polymers production processes, processing models for producers and a data

base with information on the properties of polymer materials. A key cooperative mechanism is the NBS Research Associate Programme, in which 'Guest Scientists' can conduct research at the bureau on projects of mutual interest with salaries paid by their employers. (*Chemtech*, 4/1988, p. 197).

A SENSITIVE DEVICE MEASURES SODIUM CONTENT IN MOLTEN HIGH TEMPERATURE MATERIALS

A micromembrane electrode sensor to monitor sodium content in molten materials at temperatures upto 600°C has been recently developed by Ire Bloom, an Argonne National Laboratory (Illinois, USA) scientist, in a programme funded by the US Department of Energy (DOE). This new device has already won the attention of several aluminium and paper-making companies interested in adapting it to measure impurity levels in molten aluminium and to monitor the recovery of a paper-whitening agent.

The heart of the device is an electrically conductive glass that carries sodium ions more efficiently than any other glass. The instrument is reported to be made by sealing the bottom of a narrow tube of alumina, or other suitable insulator, with a thin membrane of the glass. The tube is then filled with a liquid of known sodium concentration. When the tube is inserted into a sample to be measured, differences in the sodium levels inside and outside the tube produce a voltage proportional to the sodium concentration. (*Chem. Eng.*, 8/15/88, p. 26-27).

A NEW PHOSPHATE RECYCLING PROCESS DEBUTS IN WEST GERMANY

A new phosphate recycling process developed by the Department

of Water Technology at the Nuclear Research Centre (Karlsruhe, West Germany), is being demonstrated on a 600 m³/day (secondary effluent) level at a waste water treatment plant in West Berlin.

Pilot tests were recently completed on volumes of 10-20 m³/day, reports Project Director Dietfried Donnert. Four 441-L-stirred reactors were loaded with 50-75 kg. of activated alumina in fixed-bed filters. Operating at ambient conditions, the alumina absorbed up to 99+% of the phosphate in the waste water during a residence time of 0.5-1 hour. At any given time, input water flows in series through three of the reactors while the fourth is being regenerated.

Regeneration is done by washing the alumina twice with 50% sodium hydroxide for 45 min. The regeneration liquor is treated twice with a calcium hydroxide suspension to convert 85-90% of the phosphorus in solution to calcium phosphate. Not including credits for calcium phosphate fertilizer sales, the optimised costs are estimated at 5.5 cents/m³ of incoming water. (*Chem. Eng.*, 8/15/88, p. 27-28).

COAL-WATER FUEL MIXTURE ON THE COMMERCIAL HORIZON IN U.S.A.

Coal water fuel mixtures finally move towards commercialization in USA with the dedication of Otisca Industries Ltd., 15 ton/hour plant near Syracuse, N.Y., last July. Coal-water slurries gained worldwide attention about 5 years ago as alternative to No. 2 and No. 6 fuel oil, but attempts to market them in USA have since run into cost and technical problems.

The new product called 'Otisca Fuel', is made with the firm's proprietary T Process, which uses pentane

to agglomerate and remove sulphur and ash in the ground coal. This results in a product having about 0.4% and 0.5% of their impurities respectively, low enough to eliminate, in most cases, the need to fit boilers using the fuel with fluegas scrubbers. An engine-grade fuel has even lower sulfur and ash contents. In addition, only about 5% of the energy value of the raw coal is wasted in making Otisca Fuel, the company claims. (*Chem. Eng.*, 8/15/88, p. 21).

A SOLAR INCINERATOR FOR DIOXINS MAKES A DEBUT IN U.S.A.

The solar thermal programme at the SERI, which manages DOE's solar thermal research work, SERI in collaboration with the University of Dayton has developed solar detoxifi-

cation reactor which could achieve 99.9999% destruction of dioxin, with two significant advantages over conventional thermal methods (a) developers could achieve the above level of destruction of dioxins at 750°C, whereas conventional incineration needs temperatures of 1,200-1,300°C; (b) also, unlike incineration solar degeneration produces almost no harmful products of incomplete combustion. The key to the detoxification process is that photon energy excites the molecules in the material and combines with thermal energy to achieve destruction at a lower temperature. Last July, SERI began field testing a dioxin -- destruction unit at White Sands Missile Range, New Mexico, using a dish concentrator, which reflects sunlight into a receiver (reactor) at its focal point. (*Chem. Eng.*, 8/15/88, p. 43).

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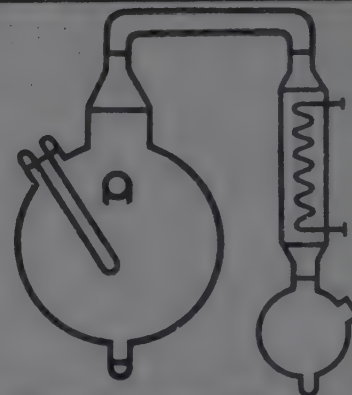
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Biotech still on a roller coaster

The past decade has seen the US biotech industry evolve into a thriving multi-faceted business. Roger Shamel and Joseph Chow, of Consulting Resources Corporation, give an overview.

Since its beginnings a little over ten years ago, the US biotechnology industry has had its share of ups and downs. Driven by investor sentiment that has waxed and waned with the slightest bit of news about products that would revolutionize the world, biotech zoomed up on a roller coaster that reached a zenith with hopes of cures of man's most dreaded ailments, and came hurtling down as these hopes were quickly dashed by clinical trials that proved less impressive.

Nevertheless, the technology is too powerful to ignore, and the potential for one of these newly cloned proteins to be "the cure for cancer" has sustained the suspense and excitement. Like watching a cliff-hanger, it remains to be seen which, if any, of these products will be the "cure". Which companies will survive to become fully integrated pharmaceutical companies? Who will really win in the patent battles? What new twists will the regulatory environment bring?

The thrill and suspense of the biotechnology industry is still here today, but much of it has been tempered by a more realistic view and expectation of the technology and what it can do.

To many observers, biotechnology may even be at another low point on its cyclical ride. Investor interest seems to have waned. Many of the products on the market are successful, but they are not the miracle cures that everyone expected. Tissue plasminogen activator (tpa), touted to be biotech's first billion dollar drug, has come under criticism

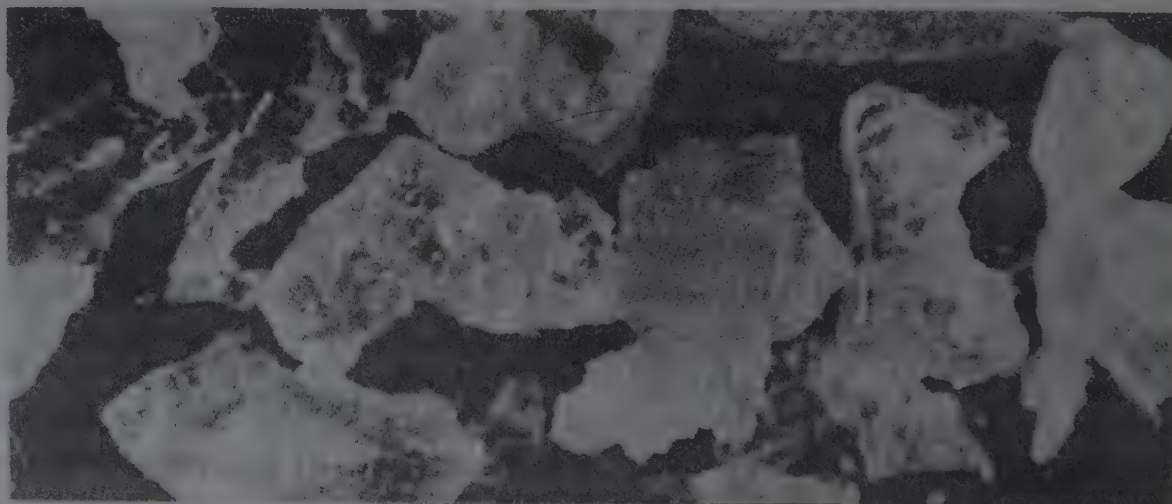
for its price and effectiveness. Proteins that were thought to be new drugs of choice for cancer, such as interferon, interleukin, and tumor necrosis factor have not had the success companies had hoped for in clinical trials. This has led to some investor disinterest. Many stocks have not recovered since the market crash last October.

But this represents just a still-frame description of an evolving industry now entering the growth phase on the classic life cycle curve. Biotechnology, like many emerging industries before it, will have upswings and downturns, start-ups and shake-outs. To fully appreciate the industry's potential, one must look to the longer term.

According to the US Pharmaceutical Manufacturers Association there are more than 80 biotechnology-based human therapeutic products undergoing commercial development in the US. Of these, 67 are still in clinical trials, and 14 are already awaiting marketing approval from the Food and Drug Administration (FDA). Scores of additional products are still in the laboratory research phase.

The next big attraction in the biotech drug pipeline will be erythropoietin (epo). This is a glycoprotein produced in the liver. It stimulates the growth, multiplication and maturation of immature stem cells into mature red blood cells. Amgen, the Californian biotech firm, submitted the drug for FDA approval last year and is expected to be first in the market with this new therapeutic. Once it is approved, Amgen will target the kidney dialysis market. Approval is expected by early 1989.

After epo, many other near-term products will follow. In the product pipeline are a variety of interferons, interleukins, colony stimulating factors, epidermal growth factors, and superoxide dismutases. Alternative and/or improved versions of earlier products such as human growth hormone and tpa are also being developed. Combination therapy, combining several proteins in a "cocktail", may be the likely form of delivery for many of these proteins. Cetus for example, is testing tumor necrosis factors in combination with interleukin-2. All in all, several hundred biotech and pharmaceutical companies have plans to commercialize human health products.



Photomicrograph of crystal clusters of alpha-2 Interferon (Intron A)

Source: Schering-Plough

Development of biotech products for the agricultural market is also gaining momentum. This is shown by the recent flurry of field-testing activity. Earlier this year, Monsanto began small-scale field tests of tomato plants genetically engineered to be resistant to the tobacco mosaic virus, tomato hornworm and fruitworm. Monsanto Canada began small-scale field testing of canola engineered to tolerate the herbicide *Roundup*. Bio Technica International began conducting field tests of recombinant bacteria for improved nitrogen fixation in alfalfa.

Ecogen received approval from the Environmental protection agency (EPA) for large-scale field testing of a biopesticide that contains a genetically altered strain of *Bacillus thuringiensis* (B.t). The EPA also approved field tests of Crop Genetics International's biopesticide against the European corn borer. Advanced Genetic Sciences completed the second field test of its *Frostban* frost-protection product and plans to begin marketing it by 1990. In May, Mycogen received registration approval from the EPA of its biopesticide, *M-One*, which is active against the Colorado potato beetle.

On the animal healthcare side, the US Department of Agriculture recently licensed Syntro's genetically engineered live virus swine pseudorabies vaccine. This pseudorabies vaccine will compete with another one just licensed earlier this year, manufactured by Novagene. Meanwhile, some dairy farmers in the US are becoming concerned about potential impacts of bovine somatotropin, which will reach the market by 1990. Their fear is that, because of the existing surplus of milk, the use of the hormone could drive smaller farmers out of business. The other major market area where biotechnology will have an impact is on

chemicals. Applications of biotech in the high-value speciality chemical industry are already established. Viable products in this category include amino acids, enzymes, vitamins, oils, aromatic compounds, biopolymers and dyes.

Although promising products are on the horizon, and the industry as a whole is showing signs of growth, biotechnology on an individual company basis remains volatile. Financing has become more difficult since the stock market crash last year, especially for younger companies. According to our analysis, many of the established companies will also be forced to raise more money within the next two years. On the legal front, courtroom battles over biotech patents are heating up. Genentech, for example, is involved in nine different lawsuits relating to its products. With its US patent for tpa now approved, the company is likely to go after even more potential patent infringers.

On the regulatory front, the FDA is in the midst of restructuring certain areas to improve its handling of biotherapeutics evaluation. Two separate centres -- one for evaluating bio-

logics and one for evaluating drugs -- have been set up, and strategies are being formulated to better facilitate the assignment of a product to the appropriate centre. In discussions at a recent Consulting Resources biotechnology executive briefing, FDA commissioner, Frank Young, commented that the administration will place greater emphasis on AIDS therapeutics in its evaluation process. In our opinion, the biotechnology industry is moving into a rapid growth phase. The flow of products has so far been only a trickle. The rate of product introduction will increase dramatically in the next few years.

Most products will be for the pharmaceutical market, where the technology is further along than in other sectors and where profit expectations are highest. However, research in agricultural and other areas has advanced faster than first anticipated and is generating increasing excitement. With all the new products entering the market place in the coming decade, we expect the biotechnology industry to grow at a compound rate of about 30%/year through the end of the century.

Table-1. Key biotech products approaching US market

Company	Product	Application
Amgen	Erythropoietin	Anaemia
Exoivir	Alpha interferon	Genital herpes
Genetics Institute	Tissue plasminogen activator	Heart attack, stroke, other
Interferon Sciences	Alpha interferon	Genital herpes
ortho	Monoclonal antibody	Organ transplant rejection
Schering-Plough	Alpha interferon 2b	Kaposi's sarcoma, other
Viragen	Alpha interferon	Leukaemia, AIDS, other
Wellcome	Alpha interferon	Leukaemia, other

Table-2: US biotech market forecast by end use

	1988	1992	1996	2000
Pharmaceuticals	540	1,800	5,000	9,000
Agriculture	35	350	1,300	2,500
Specialities	65	270	800	1,400
Other	15	110	250	350
Total	655	2,350	7,350	13,250

(Source: Consulting Resources Corporation)

(Courtesy: ECN, August 8/15, 1988)

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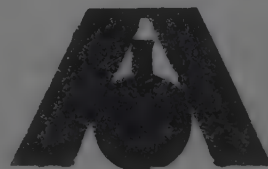
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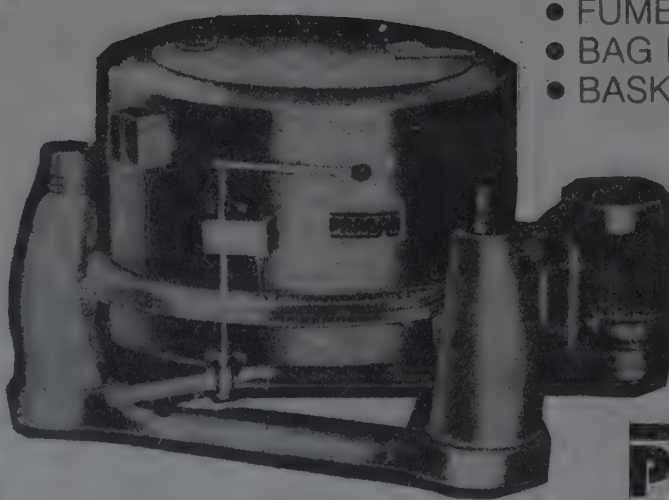
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TOPNAGS

MATERIALS MANAGEMENT (M.M.)

Part II -- Functions of Management

N.R. PAI

Concepts can be looked upon as mental models which provide a sort of a frame work for thinking. They are very much needed for a clear understanding of a complex subject. However, it is observed that mere concepts are not enough to understand a very complex subject like M.M. which has ramifications all over the different functions of an organisation. For clearer understanding therefore, M.M. should be spelt in terms of its various functions. This can be better illustrated with the help of a chart shown in Table-1.

In fact, M.M. is a broad based subject and is concerned with all those aspects which are related to materials in some way or the other. These aspects mainly include:

1. Purchasing and Procurement: Almost every organisation is dependent on other organisations for the supply of materials and services it needs. Purchasing and procurement are therefore common to all the organ-

isations. Purchasing amounts to exchange of money for the goods or services while the term "procurement" involves total responsibility of acquiring goods and services that are paid for.

2. Transportation of Materials: It is movements of materials to, through and from an organisation.

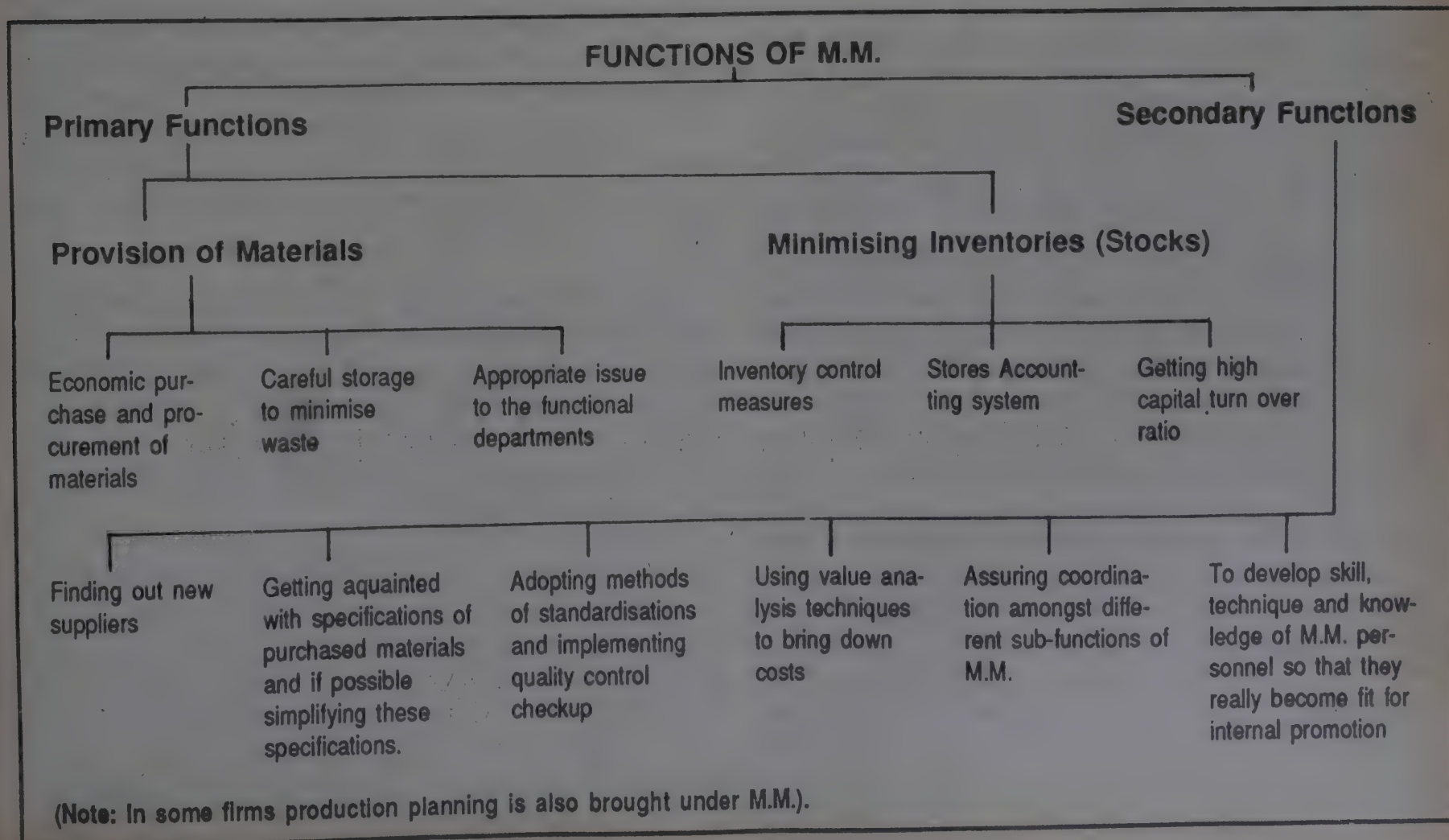
3. Conservation of Materials: i.e. preserving materials properly, maintaining their condition (they should not get off-coloured), quantity (especially of low vapour pressure liquids like gasoline, organic solvents etc. which evaporate fast) and quality (e.g. some thermolabile medicines require cold storage to keep up their potency).

4. Maintaining Optimal Material Flow.

5. Assuring Optimal Utilisation of materials to obtain required material balance.

6. Appropriate Material handling so that right material, is at right place, at the right time in the right quantity

TABLE - 1.



and of right quality. Material handling is one of the important service functions to make production activity successful.

7. Material Cost: It can be considered under two heads: Cost *of* materials and expenditure incurred on materials or cost *on* materials.

This last point needs further explanation. Material cost is generally looked upon only as the price you pay in its buying. However, this is the basic cost incurred or what can be called as the cost *of* materials. This cost by itself is sufficiently significant. It is normally more than 50% of the net price of a product.

M.M. is not merely concerned with this basic cost *of* material but it has also to look into costs incurred *on* materials. Costs *on* materials are incurred as a consequence of buying these materials. These costs include:

- a) Cost of ordering or of material acquisition.
- b) Cost of receiving inspection by M.M. Personnel.
- c) Cost of holding stocks or of carrying inventories.
- d) Cost incurred by way of paying different taxes like sales tax, excise duty, customs duty, octroi charges etc.
- e) Cost due to material waste because of spillage/spillage or substandard production.
- f) Cost due to scrap accumulation. Note that 'Scrap' is different from 'Waste'; unlike the latter it is a legitimate waste and includes for example left overs and side cuttings of raw materials. Legitimate wastes are unavoidable, however they still include material that is paid for.
- g) Cost of material handling. Every time material is handled, manually or by mechanised system or by computerised automatic system, cost is incurred. Materials handling refers to the movements of materials within organisational premises while outside the organisational premises, movements are termed as transportation and physical distribution.

The peculiarity of these "Costs on materials" is that they are latent, hidden and get buried in other organisational costs. They are therefore not highlighted and being unobtrusive they easily pass unnoticed. Further, they occur all throughout the organisation and in magnitude they are sufficiently high. It therefore becomes extremely important to find out these costs, wherever they occur and cut them down to the minimum. Again, since these costs are distributed all over

the organisation, a broad based organisation, wide approach is needed to pull them down. This is exactly what M.M. aims at. It is one of its important functions. But for its effective implementation coordination of other organisational sections or departments is absolutely essential.

M.M. has many other responsibilities. It has to maintain smooth flow of raw materials to feed the production plant, so that the manufacturing activities do not get hampered because of dearth of raw materials or because of interruption in this flow pattern. Again this flow should be maintained with minimum accompanying material handling cost.

M.M. has also to see carefully into the purchasing activities of an organisation. The materials requirements should be bought from right source or reliable supplier. Time of receiving material is very important. If it arrives much before time, stores may not have enough place to house it. Today, space is becoming costly, stores have to be used very economically. Fast moving inventory (stocks) helps in this respect. But for that materials ordered must reach in time and not too early for their accommodation in stores. If raw materials arrive late, that is again a problem. Machine loadings may be delayed which will affect production scheduled, which in turn affects output of finished goods in predetermined quantities in the time scheduled.

As a consequence, one may not be able to supply the customer with the total quantity of goods he has ordered which in turn may result in spoiling relations with him. He may then search for another supplier perhaps your competitor. To avoid all these contingencies material ordered must reach in time and for that one's supplier has to be reliable.

Again material received must be of right quality or it will affect the quality of finished goods. No substandard goods have standing in the market. Further, equipment may get spoiled or contaminated when working with substandard raw materials. Right quantity is important to keep up the production schedule and thereby dependent customer relations.

Place of receipt is equally important. This has to be carefully mentioned in every purchase order. If the material required is received at the place other than where it is needed, then time, labour and money is lost in its conveyance to the place where it is needed. To fulfill all the "rights" mentioned above regarding purchased materials then becomes one of the important duties of Materials Manager.

Again the purchased material should be stored properly, so that it is available for processing as per planning of production activity. There should be no spoilage or loss of material during storage before it is picked up by production department for processing.

Today M.M. is also concerned with proper processing, meticulously carrying out each manufacturing operation. Any flaw there means material spoilage and waste. Anything to do with materials and M.M. comes in the picture. It is the appropriate and timely processing which can lead to predetermined profits. Then only company can exist and grow.

M.M. has also to see that working capital requirements are pulled down to a bare minimum. This is achieved through effective inventory control. Stocks are so well controlled that neither production gets hampered for the dearth of raw materials nor too much funds are blocked in excessive stocks. This is achieved by adopting EOQ techniques; EOQ stands for Economic Order Quantity. This mathematical model determines the optimal quantity of raw materials to be ordered. Today, with the help of practical inventory models we can determine re-order point i.e. the point at which fresh order for materials has to be placed. In the "Fixed Quantity System" also called 'Q' system fresh order is placed for materials when a definite level of stocks are left in stores. In 'P' system also known as "Fixed Period System" fresh orders are placed at the end of pre-determined fixed interval of time. In the 'Q' system quantity ordered every time is fixed while period of placing subsequent orders may change. While in 'P' System Period of placing each order is fixed but the quantity ordered may vary. The latter system is more in use because of its convenience. To smoothen the working of inventory control today we have several modes of classifying purchased materials. Today, purchased materials are in terms of raw materials, for production, machine spare parts, machine accessories etc. Raw materials are required often and in sufficient quantities. They should be treated differently than machine spares and machine accessories which are ordered once in a way. It is natural that more money gets blocked in raw materials hence they need more attention while controlling funds involved in stocks. This has brought in ABC classification. Again some raw materials are seasonal (e.g. products of agricultural origin, say cotton) then SOS (Seasonal/Off Seasonal) classification is brought into play. Then we have imported and indigenously available materials some of which are fast moving in stores while others hardly move; depending upon these characters, materials can be classified into different types of categories. All these points we will deal in details in the communications

which are to follow.

These are the days of fast expanding technology and rapidly shifting markets. Materials Manager has to be extremely alert towards market changes. There may be some new items that have entered the market because of fast expanding technology. These items, Materials Manager can perhaps fruitfully use as his raw materials in place of old ones. They can work in two-fold manner: In the first place, they can improve the quality of goods manufactured by the organisation. Secondly, they can be used to produce cheap but suitable substitutes for his existing products. Today, we find many articles formerly made of metal are now made of plastics. Many parts of automobile for example are of plastic where metal was used for years together. They are cheap and light. Making the car light means it can give more mileage per litre of gasoline consumed. 'Value Analysis' which will be dealt with later is of immense value here.

Materials Manager has also to see from the point of view of national economy. Here his job is to save on foreign exchange by way of import substitution. He can thereby economise on purchases of foreign items. However, to achieve all these objectives Materials Manager has to get cooperation from all the other organisational departments. To ensure this cooperation is his job at least in part, if not in whole.

Human Psychology and M.M.

Human psychology is at times wonderful. When we purchase any item we pay for it. That means item bought has our money locked up in it. But then do we take care of the item we have purchased as we would take care of the cash involved in its purchase? Take the case of a costly suitcase we have purchased. We will certainly not take care of it to the extent we would take care of the cash spent in its purchase. It is this human psychology which is responsible to allow loss and spoilage of materials bought, during their storage. How much of stored low vapour pressure solvent is lost, how much loss company suffers when its purchased iron articles are rusted in stores, how much when costly material is even pilfered. It all shows that we do not take care of material purchased to the extent we take care of the money involved in its buying. M.M. exactly aims to do this. It takes care of the material purchased as if it were a cash itself.

M.M. helps to a great extent in augmenting profits by cost reduction techniques

Now for any business organisation to grow, profits have to be stepped up. In fact, to increase profits is the

aim of every commercial organisation which includes manufacturing units also. There are just **two ways** in which profit can be augmented in an industrial firm:

1. Increase the selling price of an item manufactured, keeping production cost constant.
2. Reducing the production cost, keeping the selling price stationary.

The first alternative has no practical bearing. Moment you step up the selling price (beyond the existing market price), you come down in terms of competition in the market. Your competitors would get an edge over you and perhaps may oust you from the market, if you adopt this procedure.

Therefore, the second alternative of pulling down the production cost is the only feasible solution.

On analysing, it has been observed that the cost of the materials represents the highest cost an industrial organisation incurs during production. As seen earlier it works out to anything above 50% of the net price of the product. Again we have also seen that this is the basic cost of purchasing the materials to which cost incurred on materials should be added. Hence cost reduction has the highest scope if we concentrate on cost of materials and cost on materials. M.M. aims at attacking both these costs and reducing them to a bare minimum thereby stepping up profits of the organisation. Thus M.M. helps to a great extent in augmenting profit contribution of an organisation by adopting these cost reduction techniques.

The greatest difficulty M.M. faces is often in getting proper cooperation from other functional departments. We have also seen in our previous communication that M.M. cuts across boundaries of other functional departments of organisation to the extent that it comes in conflict with conventional principles of management through departmentalisation. However, this integrated approach is administratively sound for the reasons given here-below:

1. Materials if properly managed contribute to profitability and when M.M. is an integrated approach this managing becomes quite easy. Management of materials involve mainly their purchases, storage, utilisation, movements etc. When carried out properly it leads to profitability by cost reduction methods.

2. **Interdepartmental Conflicts avoided:** Several functions served by M.M. if were to be handled by separate departments then it is quite likely that an inter-

departmental conflict of interest would arise e.g. under a separate set up, the purchase department may treat quantity discount as very important factor and buy large quantities without taking into account the warehouse facilities and inventory carrying costs.

3. **Better accountability** is achieved by centralisation of authority and responsibility for all the aspects of M.M. It also helps in objective evaluation of M.M.

4. **Better coordination** with respect to M.M. functions which are interdepartmental. So far as user departments are concerned, they have to approach only one department for their requirements.

5. **Several decisions can be easily taken** to step up profitability of a concern. These decisions are with respect to:

- a) Lowering of costs
- b) Bettering inventory turnover
- c) Stocks reduction and stocks out
- d) Lead time reduction
- e) Advantage over bulk purchase
- f) Reducing paper work etc.

6. **Miscellaneous Advantages:** These are as regards M.M. personnel; they include:

- a) Inducing team spirit
- b) Exposure to broader aspects of M.M.
- c) Offering better opportunity for growth and development.

M.M. and Organisational Control

Considering the importance of this function, position of M.M. should be at par with other recognised profit generating centers or major centers of control, namely: Production, Marketing, Finance and Personnel.

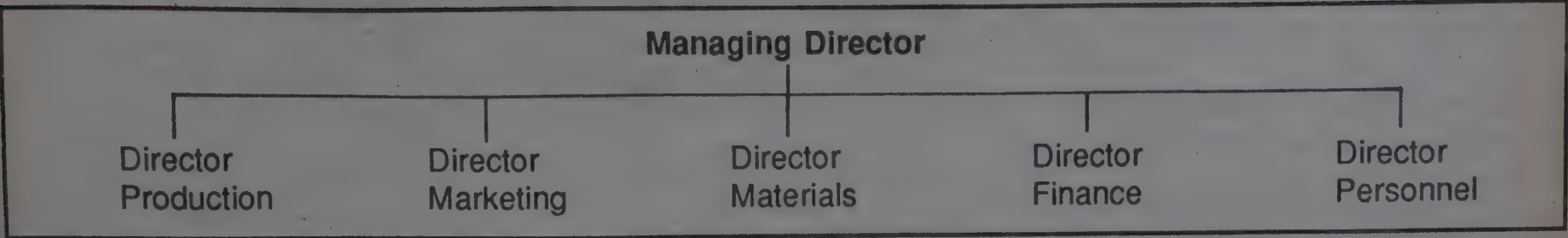
Though organisational charts and designations differ from company to company yet a typical organisational chart can be drawn as given in the chart on page 85 where M.M. is at par with other important departments of an organisation.

Two types of organisational set ups to achieve M.M. objectives

1. Organisational set up based on commodities:

Under this system of organisation, items are classified according to their nature such as:

TYPICAL ORGANISATIONAL CHART



- a) Basic raw materials.
- b) Bought out components, sub-assemblies, sub-contracted parts.
- c) Spares.
- d) Imported items.
- e) Finished goods etc.

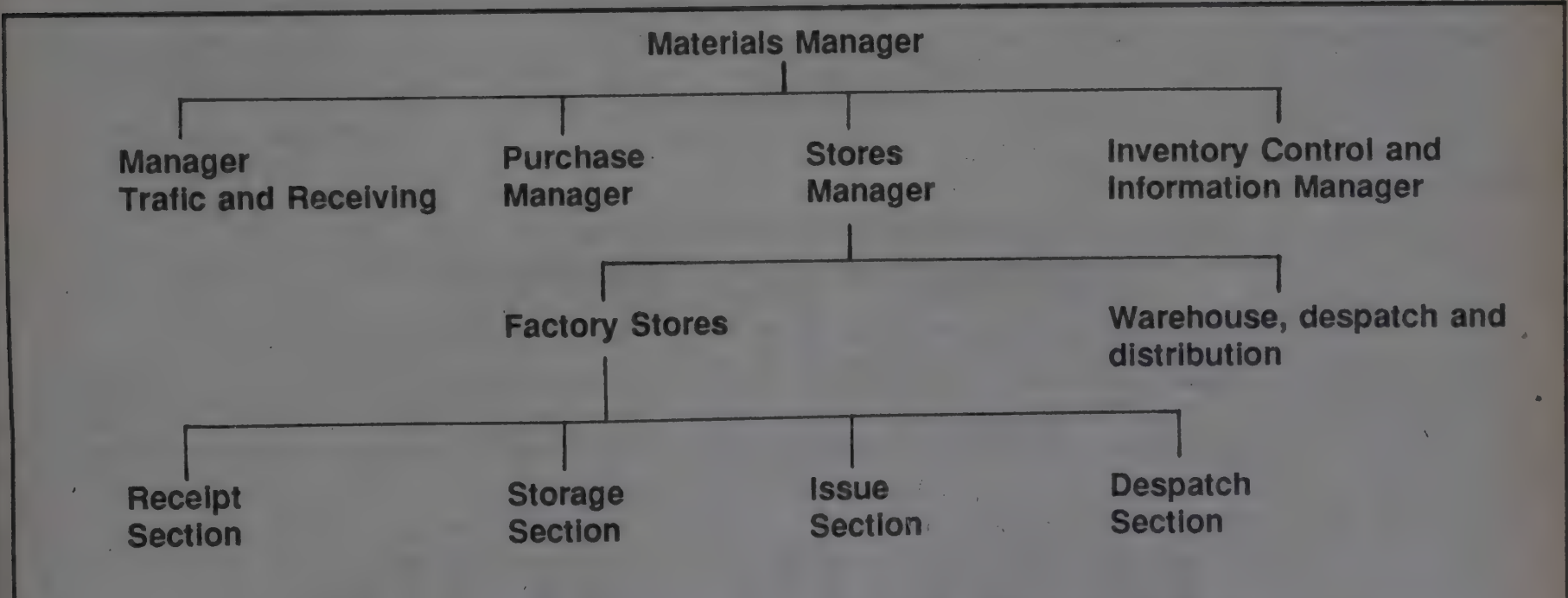
Each of these classes is assigned to separate individuals. Depending upon the importance of the commodity group in respect of operations of the company work load will vary among the groups and this would form the basis for determining the staff of each commodity group.

2. Organisational set up based on Functions

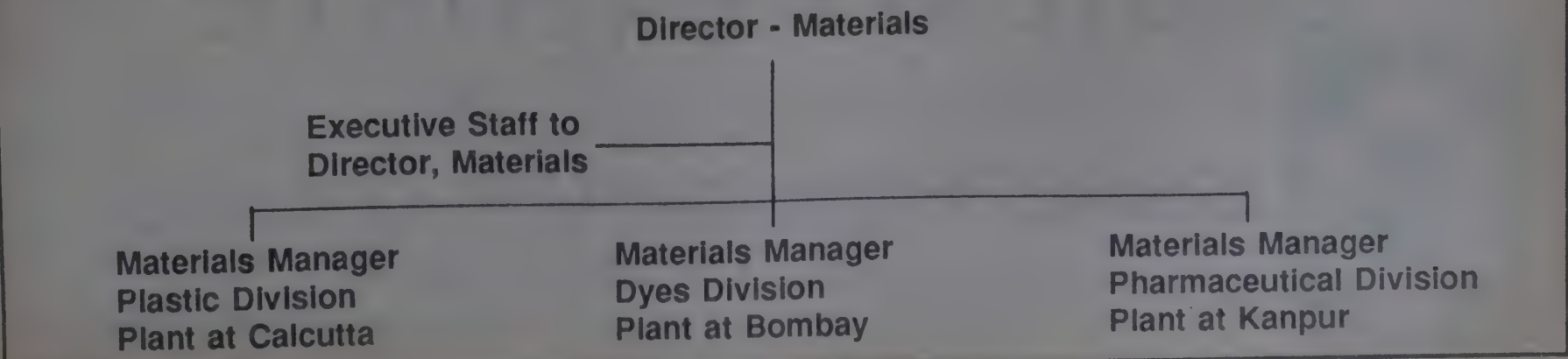
Different functions classified under M.M. are made into separate sections and their responsibility is allotted to different sectional heads. In this case coordination among the sections has to be up-to-date and efficient for proper functioning to give effective results. Also since the activities are interdependent there is bound to be a cross check amongst the sections.

Since this second organisational set up is more often employed we will consider organisation chart based on it.

ORGANISATIONAL CHART BASED ON FUNCTIONAL GROUPING



In case of multiplant operations running diversified products a combined organisational chart as follows can be drawn:



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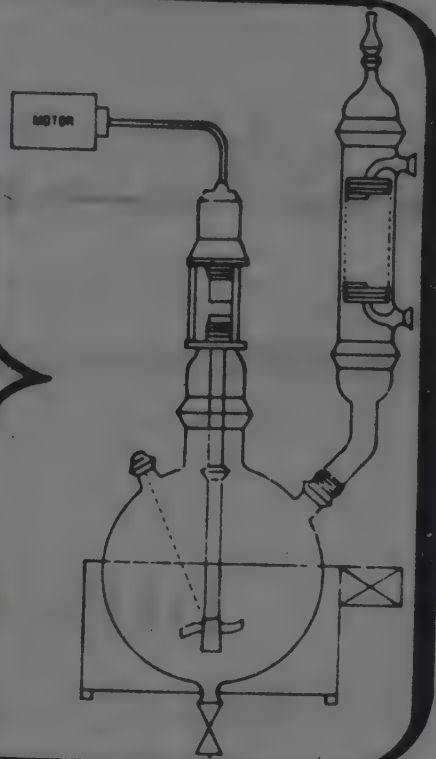
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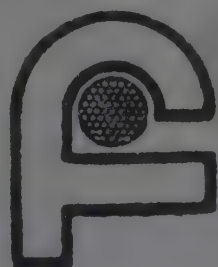
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Chemical News From Abroad

KARIN B DILEMMA EXPOSES EUROPE'S WASTE PROBLEM

The toxic waste ship, **Karin B**, that has been haunting Europe's coastline looking for a berth, has highlighted a major growing issue for the chemical industry. The disposal of toxic waste — whether produced by chemical companies themselves, their customers, or even users of their products — is an issue increasingly in the public eye.

Karin B, the West German registered vessel loaded with a badly-packed and possibly leaking cargo of 2,100 ton of toxic waste, was barred from docking in the UK by the department of the environment. A spokesperson for the department said the cargo was not properly identified, thus the ship could be barred under law. Under the UK's pollution control regulations covering waste, certain substances must be held in dock for three days while the local authority checks the consignment documents. During this time the local authority must also make sure that the treatment facility which is to receive the waste is properly licensed.

Soon UK hazardous waste import regulations will be tightened when the country finally makes law the European directive covering the transshipment of wastes across national boundaries. This will mean that four weeks' prior notice is required before a hazardous cargo can be shipped. A list of hazardous substances covered has been drawn up by the EEC commission but individual countries will be able to specify additional materials.

The UK's department of the environment, however, believes this will lead to confusion and wants one list only.

Other steps towards tightening the movement of toxic waste will be contained in a new directive on "toxic and dangerous waste" currently being prepared by the EEC commission. Current guidelines on the transfer of hazardous wastes require that a company wanting to import or export has to fill out a special form detailing the source, nature and quantity of the waste. But strict controls, say sources, are only found in West Germany, the Netherlands, Denmark and Belgium.

Concerning the immediate problem of the **Karin B**, and a sister ship, **Deepsea Carrier** believed to be in the Mediterranean carrying waste from the same site — a scandalous Italian waste dump in Nigeria — the UK department of the environment says there is no reason to reject waste for treatment if it is properly packaged and identified.

The two UK firms licensed to incinerate toxics at very high temperatures, **Rechem** and **Cleanaway**, both refused to treat the Italian waste, saying they never deal with brokers or third parties. The two firms, along with **Greenpeace** in the UK and Italy, have called for the waste to be sent back to Italy for repacking. **Ambiente**, the environmental services subsidiary of Italian state firm **Eni**, has been commissioned to ensure disposal of the waste.

Meanwhile **Eni** chemicals subsidiary, **Enichem**, denies that any of its waste falls into third party hands. The company claims that all its toxic leftovers are incine-

rated at one of four facilities.

Most major chemical companies noted that toxic waste was either handled in-house or was carefully monitored if in the hands of licensed contractors. The Italian waste dumped in Nigeria, however, is believed to have been sourced from a medley of small companies by rogue brokers, which clearly continue to pose problems for the industry.

The names of **Hoechst**, **Bayer** and **Dyno** were linked with waste dumped in Nigeria, although **Hoechst** and **Dyno** maintain the only possibility is that someone used old drums marked with their names, for carrying the materials.

However, the **Friends of the Earth** was prompted to state: "We challenge the chemical industry to prove that it abides by a 'duty of care' to demonstrate to the public that it remains responsible for its wastes from cradle to grave."

To some extent this is already happening. As commercial incineration capacity in Europe becomes more tightly stretched companies are starting to build their own facilities, giving them greater control over their waste.

Dow, for example, is building a 25-30,000 ton/year unit at its **Stade**, West Germany site costing some \$20m. This unit should start up at the end of next year. **Solvay**, too, is looking at an incineration unit at **Jemeppe**, Belgium, to cope with waste once burning at sea is stopped. In the UK, **ICI** and **Ciba Geigy** are considering their own units, even though commercial facilities are being extended. **BASF** and **Bayer** are installing extra facilities and many firms are participating in communal units.

Companies note, though, that the permitting process is slow and that incineration is just one answer to a waste problem. Other methods being pursued by Exxon Chemicals, for example, include immobilisation of toxic materials.

One company noted that average costs of disposing of waste were around \$25/ton in the early 1980s but had risen to \$90-100 as increased use of incineration replaced landfill and sea dumping in Europe. Costs can be up to \$2,000/ton for highly toxic waste needing to be incinerated above 1,200°C.

Estimates differ on the amount of toxic waste disposed of in Europe from 20-30m ton/year to 150m ton/year. Much depends on definitions.

SENTRACHEM EXITS FERTILIZERS SECTOR

South African chemicals group Sentrachem has announced the sale for Rand 175m (\$72m) of its fertilizer business to a consortium of three rival producers, Sasol, AECI and Omnia.

Sentrachem says that over-capacity in the sector combined with the fact that its fertilizer division, Fedmis, has no strategic interests in the basic raw materials for fertilizer manufacture, led to its decision to sell the business.

Heavy losses in previous years had finally been turned round into a small profit for the year to March 1988 and facilitated the sale of the business.

Fedmis has the capacity to produce 1m ton/year fertilizers and has around 23 per cent of the South African market. Re-

ports in the local press put total South African fertilizer sales in 1987 at just 2m ton against current capacity of 4m ton.

DSM, KEMIRA PACT

Finland's Kemira and DSM of the Netherlands have finalized the deal covering the exchange of certain fertilizer assets.

The agreement increases Kemira's share of the NPK market, strengthens its presence in the UK and the Netherlands and makes it Western Europe's second largest fertilizer manufacturer. The total turnover of the units acquired by Kemira is put at around Fmk1.4bn (\$318m).

For DSM, it represents a major step in its strategy to exit mixed fertilizers and concentrate on nitrate products.

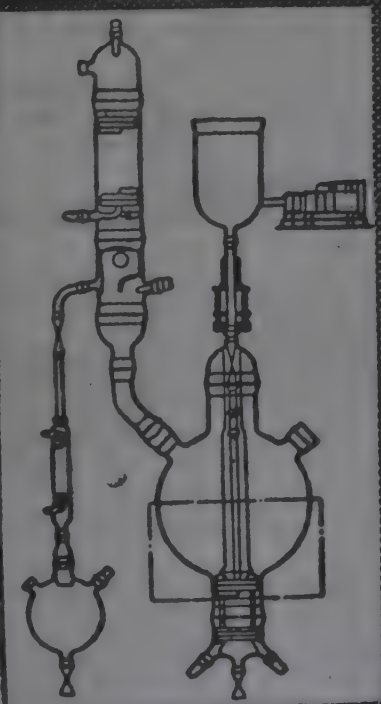
Kemira plants to reduce the 650-strong workforce at the Pernis nitrogen and phosphate fertilizers plant by 200 over the next two years but output will remain the same. There will also be some job losses — around 100 — between now and mid-1989 at DSM Agro's Utrecht headquarters.

SUPERCONDUCTOR BID

In a bid to take a stake in the potentially lucrative superconductor field, Du Pont is spending \$4.5m over the next three years to acquire the rights to patent applications belonging to the University of Houston, Texas. The deal, which initially covers high temperature superconductors, also covers any future patents that may emerge from these applications.


(Contd. on p. 94)

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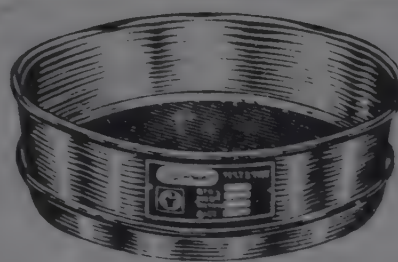
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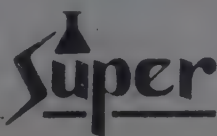
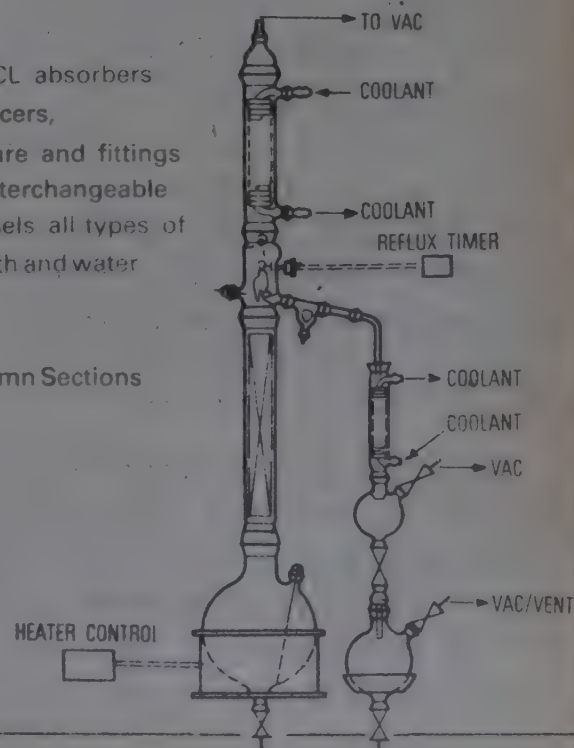
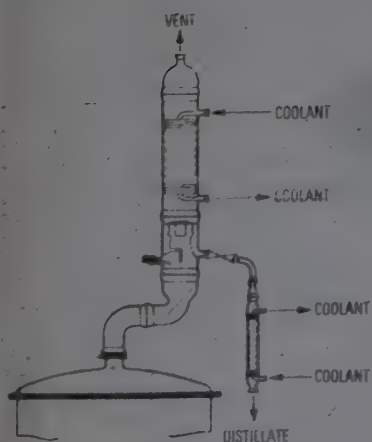
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(Contd. from p. 91)

The deal will give Du Pont exclusive rights to commercial applications under any patent granted for Professor Paul Chu's original high temperature superconducting compositions. The company also has first refusal for rights to other superconductor inventions coming from Chu's laboratory over the next three years.

E&E DEAL DOUBLE U.S. DISTRIBUTION BUSINESS

Continuing its push into the US market, chemical distributor Ellis & Everard is to acquire United Chemicals from Sanitas Inc. for £21.2m (\$36m). The move will double the size of the UK company's existing US operation.

United Chemicals has a distribution network covering Pennsylvania, Ohio, Virginia, Maryland and North Carolina plus parts of neighbouring states. For the year ended June 1988, the company turned in pre-tax profits of \$4m on sales of \$87.6m. Its operations involve the storage, sale and distribution of a range of industrial and speciality chemicals.

According to Ellis & Everard, the US firm will provide an excellent geographical fit with its existing east coast distribution network by extending its operation northward. Other benefits include the exchange of information and technology, and the widening of its product range, the UK firm noted.

E&E managing director Mike Marshall commented: "The proposed acquisition provides an ideal opportunity to expand our US operation allowing the enlarged group to capitalize on the current strength of the US economy." Total sales in the US will move ahead to more than

\$170m/year.

E&E first entered the US chemical distribution market with the acquisition in 1982 of American Industries Chemical Corp, following this with the purchase of Prilaman in 1984, and Apperson Chemicals in 1986. It has also invested in several greenfield sites.

E&E says investment in the US is for three basic reasons. It believes the US economy is one of the strongest in the world; the market is large and fragmented with current annual consumption of chemicals in the US estimated at more than \$200bn; and an increasing proportion of these sales are carried out through distributors.

Under the terms of the agreement to acquire United Chemi-

cals, which has to be approved by the US anti-trust authorities and shareholders of both E&E and Sanitas, around £18m is being paid for the business plus a further £3.2m in return for a five-year non-compete agreement with Sanitas and United.

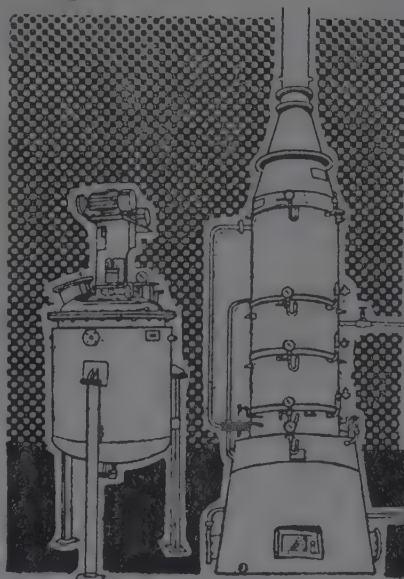
E&E has announced a rights issue to raise around £25m to fund the acquisition.

BURMAH BUYS APP CHEMICALS

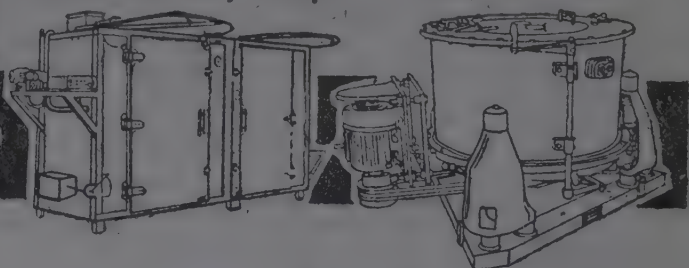
Burmah Speciality Chemicals has paid around £8m (\$13.4m) to acquire APP Chemicals Ltd., a refiner and marketer of atactic polypropylene (PP).

Atactic PP is an inert by-product of PP manufacture and has its main applications in the con-

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APP, with sales of around \$3-4 m, has operations at Market Drayton in the UK and a subsidiary, Performance Polymers BV, in the Netherlands. It is being incorporated into Burmah's coatings division. Chief executive of the division, Dr. Brian Ridgewell, described the new acquisition as: "The major European refiner and blender of atactic polypropylene," adding that its technology and markets are a good fit with other companies in the coatings division.

Although Burmah already makes extensive use of atactic PP, a company spokesman said the acquisition was not being made in order to secure supplies; as part

of the chemicals group, product could be marketed more widely and new applications developed.

Total production at APP's two sites, where work to increase capacity is currently under way, is around 10,000 ton/year. In global terms, total output is more than 200,000 ton/year.

Growth varies according to application, but was estimated at 20 per cent/year for roofing felt and about 10 per cent/year in hot metal adhesives, the second largest use for APP.

BID RUMOURS HAUNT GOODRICH

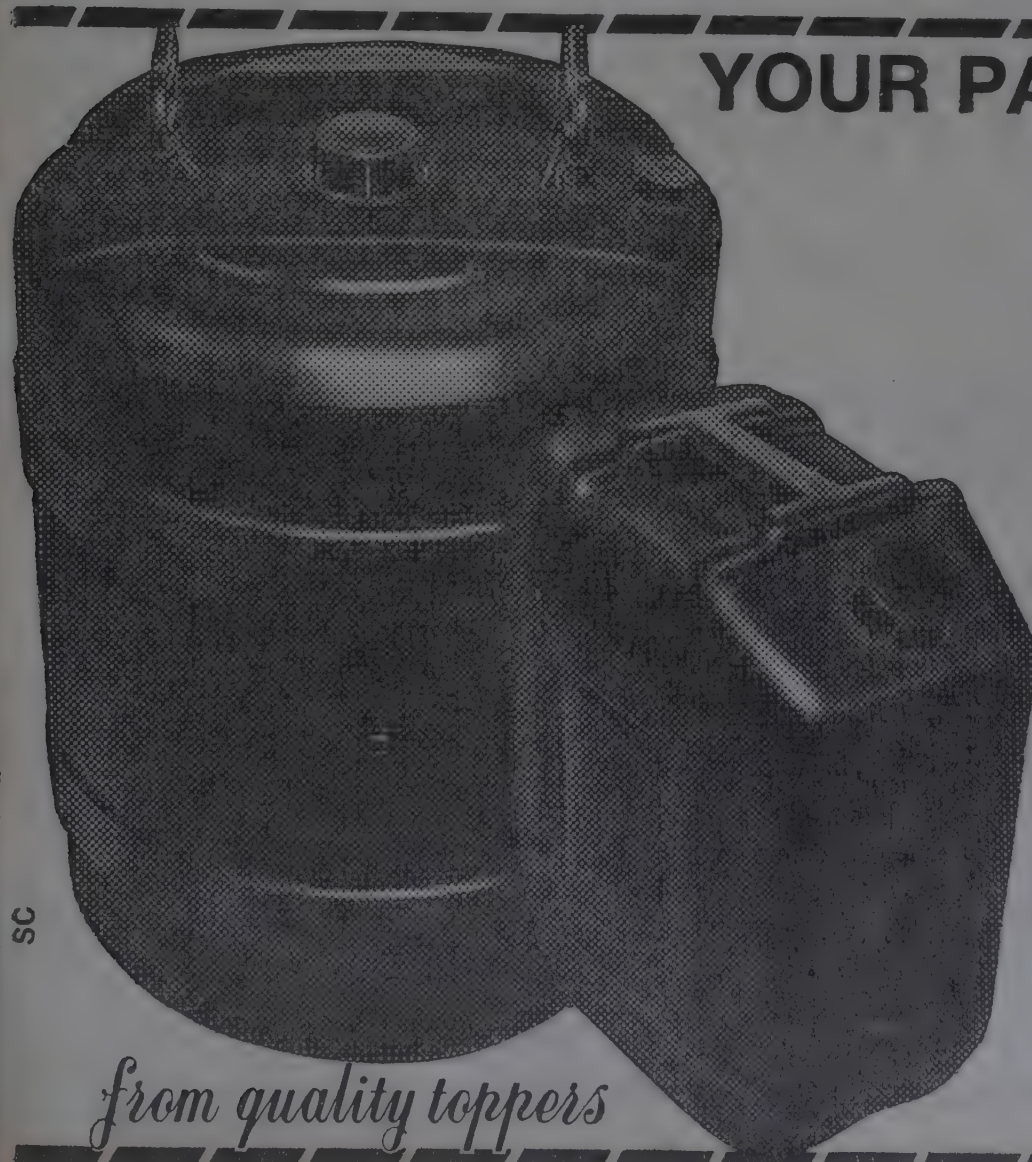
BF Goodrich resurfaced as a potential takeover target on the back of market rumours that Hanson Trust and UK financier Sir James Goldsmith were preparing

a \$75/share bid for the PVC giant. The company is currently valued at around \$1.88bn.

Spokesmen at both Hanson and Goodrich refused to comment on the rumours. But the US firm has often been mooted as a takeover candidate; as one observer commented, it is simply a question of when and by whom.

There is no doubt that Goodrich is an ideal break-up candidate, being neatly compartmented into three main distinct businesses: the current star performer, PVC and intermediates, speciality chemicals, and aerospace and defence products. It also has a relatively small industrial products business.

The trading levels were around \$54/share but one US analyst valued the stock at \$80-90/share.



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NOTICE

Notice to the members of the public under sub-section (4) of Section 23 of the Monopolies and Restrictive Trade Practices Act, 1969, read with rule 4A(1) of the Monopolies and Restrictive Trade Practices Rules, 1970.

It is hereby notified for the information of the public that **DCW LIMITED** proposes to make an application to the Central Government in the Department of Company Affairs, New Delhi under sub-section (4) of Section 23 of the Monopolies and Restrictive Trade Practices Act, 1969, for approval to the take-over of the whole or part of **TITANIUM PIGMENTS AND CHEMICALS LIMITED**.

Brief particulars of the proposal are as under:

- | | |
|--|---|
| i) Name and address of the applicant | : DCW LIMITED
Regd. Office: Dhrangadhra-363 315, Gujarat State.
Head Office: Nirmal, 3rd Floor, Nariman Point,
Bombay 400 021. |
| ii) Name and address of the undertaking the whole or part of which is proposed to be taken-over and the manner of take-over, i.e. by acquisition of shares, acquisition of control or management, whether by the acquisition of the ownership of the undertaking or under any mortgage, lease or licence or under any agreement or other arrangement | : TITANIUM PIGMENTS AND CHEMICALS LIMITED
Arumuganeri P.O., Sahupuram,
Chidambaranar Dist., Tamil Nadu.

By acquisition of shares |
| iii) Management structure of the applicant | : The company is managed by three Managing Directors who are subject to the superintendence, control and direction of the Board of Directors of the Company. |
| iv) Capital structure of:
(a) the applicant (as on date) | : Authorised capital: Rs. 11,00,00,000 divided into 1,00,000 preference shares of Rs. 100 each and 1,00,00,000 equity shares of Rs. 10/- each.
Issued and subscribed capital: Rs. 2,94,39,220 comprising (i) 56 - 15% cumulative redeemable preference shares of Rs. 100/- each fully paid-up and (ii) 29,43,362 equity shares of Rs. 10/- each fully paid-up. |
| (b) the undertaking proposed to be taken-over | : Authorised capital: Rs. 5,00,000 divided into 50,000 equity shares of Rs. 10/- each.
Issued and subscribed capital: Rs. 700, comprising 70 equity shares of Rs. 10/- each fully paid-up. |
| v) Line(s) of business of the undertaking which will or is likely to emerge as a result of the proposed take-over | : Titanium Pigments & Chemicals Limited was incorporated for the purpose of manufacturing Titanium Dioxide and the same will be undertaken as and when suitable technology is available. In the meantime, the Company will manufacture and export Synthetic Rutile which is an important raw-material for producing Titanium Dioxide. |
| vi) Consideration for the take-over | : Rs. 700/- which will be paid for the 70 equity shares of Rs. 10 each. |
| vii) Scheme of finance indicating the source(s) of finance for the proposed take-over | : From the Company's own generated funds. |

2. Any person interested in the matter may make a representation to the Secretary, Department of Company Affairs, Government of India, Shastri Bhavan, Dr. Rajendra Prasad Road, New Delhi, within 14 days from the date of publication of this notice intimating his views on the proposal and indicating the nature of his interest therein.

Dated this 3rd day of October, 1988.

Shashi Chand Jain
Managing Director
DCW LIMITED

Chemical Markets Abroad

EXXON, DOW CONSIDER NEW ETHYLENE PIPELINE

The monopoly enjoyed by the ARG pipeline in handling ethylene distribution in mainland Europe could be under threat, with Exxon, Dow and others believed to be considering a separate pipeline along the busiest section between Antwerp and Tessenlo in Belgium.

Plans are still at a tentative stage, but the move reflects increasing disquiet amongst ARG users about excessive congestion on the Western section of the line and the heavy toll charges. Exxon and Dow are said to be considering plans independently but the two companies have had discussions and seem likely to move together, possibly with the support of other parties outside the ARG consortium.

The ARG itself has responded with plans to debottleneck the pipeline in Belgium by either laying a second pipeline to improve ethylene flow or install more booster stations. It is also believed to be in discussions to lower toll charges on long term contracts.

The ARG (Aethylen Rohrleitungs Gesellschaft) pipeline forms the backbone of mainland Europe's ethylene distribution network running 450 km from Antwerp to the Ruhr industrial area of West Germany. Over 20 companies which buy and sell ethylene are connected to the line, which is currently handling over 1m ton/year of product. It is owned by a consortium of BP, Bayer, Erdolchemie, Veba, Huls and DSM but operates independently.

However, the pipeline is now running at capacity and there have been continued distribution problems due to excessive con-

gestion. Buyers have found it difficult to purchase small quantities on a spot basis to top up supplies, and the position looks set to worsen with continued debottlenecking work on ethylene crackers and expansion in downstream units.

Exxon is facing an increasingly uncertain future on ethylene supply security in the region. The company does not buy ethylene through the ARG, but brings product from its UK cracker at Mossmorran to polymer units at Meerhout in Belgium along the ARG via an import terminal at Antwerp and Dow's terminal at Terneuzen.

Exxon is planning a major expansion of polyethylene, increasing capacity of the 245,000 ton/year polyethylene plant by 50 per cent in three stages, which will boost its ethylene requirements to around 360,000 ton/year at the Meerhout site.

Meanwhile, problems of supply in the western section of the ARG pipeline are likely to worsen with the start up of the new Finaneste cracker at Antwerp in late 1990 which will feed Neste's new 200,000 ton polyethylene unit at Beringen.

For Dow, the problems of congestion are not so severe, as most of its operations are concentrated at Terneuzen, west of Antwerp. However, the tie up with Exxon would make sense as it would connect Exxon directly to Dow's ethylene line between Antwerp and Terneuzen as well as Dow's own PE unit at Tessenlo.

Sources still believe, however, that Exxon and Dow may eventually agree to the ARG's own plans for debottlenecking. The sticking point is still likely to be toll charges, with Exxon maintaining it

will go ahead with the plans unless the ARG can guarantee supply security and piping costs on a par with its own scheme.

SAUDIS OPPOSE GSP RULING

Saudi Arabia has hit back at the EEC decision to have the duty free import quota on seven of its products under the new generalized scheme of preferences (GSP).

The change occurred under a technicality clause incorporated into the GSP which allows quotas to be halved and eventually lost if they are substantially exceeded.

Under the 1989 scheme, quotas on Saudi methanol, lldPE, hdPE, melamine, MEG and styrene will be halved.

Sabic vice chairman and ceo Ibrahim Ibn Salamah has urged the EEC to reconsider its proposal, saying he regards the move as, "an obstacle which may hamper the current EEC/GCC negotiations." He claims the Saudi quotas are the lowest of any country.

The GCC (Gulf Cooperation Council) is currently seeking a total free trade agreement with the EEC and is especially keen to seek duty free entry on petrochemical products, most of which come from Saudi Arabia, although this is opposed by the European chemical industry.

The quotas are calculated on monetary value, and Sabic complains that because of the rise in petrochemical prices, the reduction will limit the duty free tonnage for 1989 to only one quarter of this year's figure.

With petrochemicals supply so tight Saudi material is welcomed in Europe at the moment. However, the anti-free trade lobby is still arguing that if markets turn down, unwelcome product currently sold in higher value markets may return to Europe.

WARNING ON US ETHYLENE SURPLUS

Ethylene expansion plans currently in place should reverse the tight supply-demand balance in the US, but a report from US consultant Bonner & Moore warns that they could lead to a return to industry overcapacity by the 1990s.

US ethylene producers plan to add around 4.8m ton of capacity by 1993 representing a jump of around 29 per cent above mid-year 1988 capacity levels. "Such an increase could result in temporary overcapacity and lower ethylene prices as soon as 1991," says Bill Urquhart, manager of chemical planning at Bonner & Moore.

Reported plans for ethylene expansions are larger than the industry had expected. Of the total figure, around 2m ton comes from new crackers announced by Quantum at Dear Park, Phillips Petroleum at Sweeny and Dow at Freeport. The remaining 2.7m ton is composed of 2.3m ton from expansions at existing units and further 400,000 ton or so from restarting idled capacity.

As plans now stand, the biggest increases would occur in 1991 and 1993. "The immediate effect of these expansions will be to provide some welcome relief in a tight market," says Urquhart, "but a temporary drop in demand such as would occur with a recession could send prices tumbling."

SPAIN'S IQA MULLS CRACKER RESTART

Shell subsidiary IQA is believed to be considering restarting its 70,000 ton/year ethylene cracker at Tarragona in Spain. The unit was mothballed in 1982 and has been on standby since then but sources believe it could be brought back into operation fairly quickly.

IQA (Industrias Químicas Asociadas) has a number of units for ethylene and propylene derivatives at Tarragona, including 70,000 ton/year ethylene oxide and 60,000 ton/year of MEG. The company currently sources its ethylene from producers in Spain.

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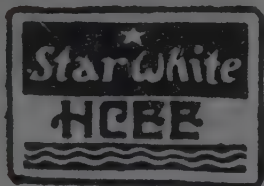
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Environment

DU PONT PLANS HFC-134A UNIT, GERMANS RAISE R&D

Du Pont is to treble its capacity for the chlorofluorocarbon (CFC) alternative HFC-134A by converting a plant belonging to Conoco at Ponca City, Oklahoma. The pilot plant, costing \$5m, will be on stream by early next year. Originally the facility was to be used for another product but demand for CFC alternatives is growing.

Ponca City, according to a Du Pont spokesman, is the next step in a scaling-up sequence needed to commercialize HFC-134A. The facility will provide additional quantities of the compound for toxicity testing and market development. The company expects this programme to take another two years.

In addition to the Ponca City investment, Du Pont will be spending about \$25m on a CFC alternative programme. The company's goal is to end manufacture of fully halogenated CFCs as soon as possible, "through an orderly and safe transition to alternative products." Du Pont expects that its fully halogenated CFCs will be phased out of several major market segments in the early to mid-1990s but total elimination will take until the end of the century.

Meanwhile, in West Germany five leading household appliance manufacturers have agreed to foot most of a DM10m (\$5.4m) research bill to seek alternatives to CFC in refrigerating agents and refrigerator insulating materials.

The R&D project, instigated by AEG, Bauknecht, Bosch-Siemens, Electrolux and Liebherr,

which will complement work being done by CFC makers, will also study ways of disposing of CFCs in spent cooling liquids and foams. As the electrical appliances manufacturers association, ZVEI, points out, even if CFC substitutes are found in the near future there is still the problem of what to do with 40m existing household refrigerators containing CFCs.

Hoechst and AEG have both developed processes to aid CFC recycling. AEG plans to apply for a process patent that siphons off CFC gases during repairs. Last year Hoechst became the first CFC producer in Europe to set up a system for recycling refrigeration liquids containing CFCs.

GERMAN PVC THREAT

In response to the bad publicity generated by environmental groups, West Germany's PVC industry has set its working group on PVC and the environment (Arbeitsgemeinschaft PVC und Umwelt — AgPU) the target of improving the environmental and protection aspects of polymerization and processing plus end use and disposal.

The group aims to solve the problems of waste disposal and incineration by increasing both recycling efforts and downstream processing.

Meanwhile, a group of producers and processors are attempting to counter moves by the Greenpeace and the country's largest environmental group, Bund, to have PVC use either banned or restricted by local authorities.

GREENS CALL FOR FRENCH PCP BAN

West Germany's Green Party is calling on its government to

put pressure on the French authorities to implement a ban on pentachlorophenol (PCP) production by Rhone-Poulenc. The French chemical major is Europe's leading producer of PCP with an annual capacity of 6,000 ton/year.

The Greens claim the chemical, commonly used as a wood preservative, contains dioxins. As the compound is used to treat fruit boxes, the Greens warn that there is a risk that both fruit and the workers handling the boxes could be contaminated.

Rhone-Poulenc points out that there are many different types of dioxin and this kind is not harmful particularly at these concentrations. The EEC has already rejected a request from the West Germans to ban PCP while the Rhone-Poulenc, are as stringent rules governing its use, argues as those in the US where the product is not banned.

JAPANESE ETHYLENE PRODUCTION RISES

Ethylene production in Japan has jumped by 3 per cent during the first half of 1988, as producers restart mothballed units following the lifting of the temporary measures law by the trade and industry ministry, Miti.

Around 300,000 ton of capacity has been restarted this year representing the first production hike by the industry for over six years. Output for the first six months was 2.43m ton against 2.26, ton in the same period last year.

Latest figures from the Japanese petrochemical association showed across the board production increases for the major petrochemicals, and gains for the full year will be further lifted by the restart of units for LDPE, HDPE, VCM and styrene.

Biotechnology

INVITRON PERMIT SPARKS ROW

Green party members of Hanover city council are furious that Invitron, the Monsanto subsidiary, has been granted permission to build a DM90m (\$48.4m) laboratory complex to work with genespliced cell cultures for drugs at the medical park research centre in Hanover, West Germany.

Invitron will be able to avoid a statutory public hearing for the plant as approval was granted on August 31. From September 1, new state legislation requires that all industrial scale genesplicing projects will be subject to public hearing.

The Green-Alternative faction of the Hanover city council alleges that the permit has been rushed through the regulatory procedure. Invitron's application for a building permit was only filed at the end of May, and according to the party was, "pushed through under the wire." In addition the project is to receive subsidies of about DM30m from the state of Lower Saxony and the city of Hanover.

The trade inspector's office in Hanover said the safety of the project has been backed by the Medical College of Hanover and only one restriction has been placed on the project. Invitron must use vacuum pressure when working with the gene-spliced animal cell cultures.

CROP PLAN SEEKS FUNDS

A consortium of two Scottish and one West German institutes

is applying to the science and research directorate general at the EEC for a grant to develop potatoes that can produce commercially important chemicals and drugs. The Scottish Crop Research Institute (SCRI), Paisley College of Technology and the Institut für Genbiologische Forschung have applied for a laboratory twinning grant.

The researchers are planning to conduct more fundamental research into the genetics of the gene responsible for the soluble protein patatin. Scientists at the institutes have already discovered that the gene possesses variable regions and have sequenced the DNA.

Mike De Maine at the SCRI, believes that the teams will be able to insert genes for commercially important proteins into the patatin gene. The patatin protein is a glycoprotein and the teams plan to hijack the gene's ability to add sugars to proteins.

The consortium is applying for a grant of Ecu 465 944 (\$515 540). The institutes expect to apply for an EEC Eclair programme at a later stage and hope to attract interest from firms.

LAB WORKERS FACE AIDS VIRUS RISK

Laboratory workers handling material infected with either the Aids or Hepatitis B virus, run the risk of contamination if their safety gloves consist of a single layer of latex. This warning comes from researchers based at Ad-

vanced Biotechnologies and the national institutes of health.

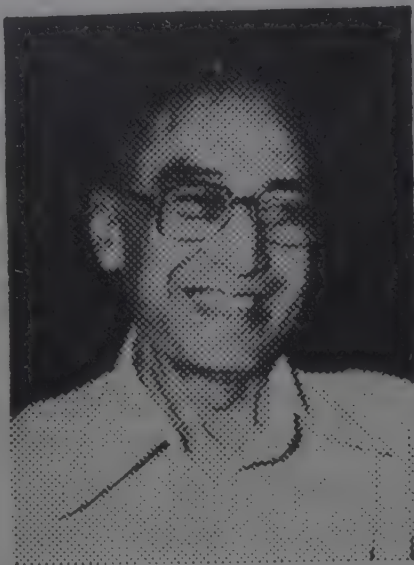
Using a scanning electron microscope, the scientists discovered that four brands of safety gloves contained superficial pits up to 30 micrometres deep as well as sinuous chemicals 5 micrometres wide running through the thickness of the glove. The researchers are now recommending, in spite of claims that latex gloves exclude viruses, that laboratory workers wear two layers of gloves preferably coated with viricides.

Meanwhile, researchers at the London International Group have found that oil based lubricants weaken latex condoms. The researchers report that exposure to baby oil, petroleum jelly or corn oil at body temperature causes major and often dramatic loss of mechanical integrity.

BBL HITS TARGET

British Bio-Technology Ltd, the Oxford-based health science company, has announced results for the year ended 30 April. Dr. Keith McGullagh, BBL's chief executive officer described the figures as right on target. The company reported net operating expenditure of £2.7m (\$4.56m) and income of £1.2m from its sales of Designer Genes and from funded collaborations with pharmaceutical companies.

Because of substantial investment in R&D, McGullagh explained, the company expects to return losses for several years to come. However, he described the progress in developing novel pharmaceutical entities as very encouraging.



Shri Haribhai Patel

Chairman: Transpek Industry Ltd.

Expired on 25.8.88

अद्वेष्टा सर्वभूतानां मैत्रः करुण एव च।
निर्ममो निरहङ्कारः समदुःखसुखः क्षमी॥

"Without hatred towards anyone, friendly and compassionate, without attachment and ego, balanced in pain and pleasure and forgiving."

Shri Haribhai Patel had these divine traits and directed his life in accordance with the spirit of the Bhagvad-Geeta. He led a simple life which was devoted to the service of industry and society without any self-interest.

Deeply mourned by the Directors and Staff of Rasendra Chemexport Pvt. Ltd., Bombay.

MARKET INFORMATION

Chemicals Steady

A steady condition prevailed in the Bombay Chemicals and dyes market during this week. Dyes market continued to be buoyant. Caustic soda and Soda ash returned to their previous levels. Titanium Dioxide was a bit weak at the beginning of the week.

Phthalic anhydride was doing well. Nickel salts moved up owing to increase in prices of Nickel Metal. Solvents had normal turnover.

Dyes intermediates were in shortage. Export enquiries were substantial in both dyes and dye intermediates.

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

(Prices as on 5th October 1988)

INDUSTRIAL CHEMICALS		Per kg			
Ammonium sulphate	2.00	Bleaching powder (33% Cl)	4.20	Calcium chloride 36% (Anhydrous)	5.00
Ammonium phosphate (Mono)	14.50	Borax (Granular)	13.50	Calcium Carbonate PPT	3.00
Ammonium phosphate (Di)	12.00	Borax (Powder)	21.00	Calcium carbonate (Activated)	3.55
Ammonium carbonate (Di)	17.00	Boric acid (Tech)	22.00	Camphor (Indian)	100.00
Ammonium bicarbonate	5.60	Bisphenol-A	70+ST	Cresylic acid	50.00
Ammonium chloride	4.00	Butyl carbitol	50.00	Cream of Tartar (Tech.)	70.00
Ammonium nitrate	6.50	Caustic soda (Flakes)	8.80	Citric acid (Belgium) (Resale)	46.00
Arsenic white powder	21.00	Caustic soda (Solid)	8.70	Citric acid (Indian) (Resale)	46.00
Acrylamide (Resale)	58.00	Caustic soda (Lye)	6.10	Copper sulphate	19.75
Barium carbonate	6.00	Calcium chloride 70% (Solid)	3.25	Chromic acid	48.00
		Calcium chloride 75-80% (fused)	3.50	Ethylene urea	56.00

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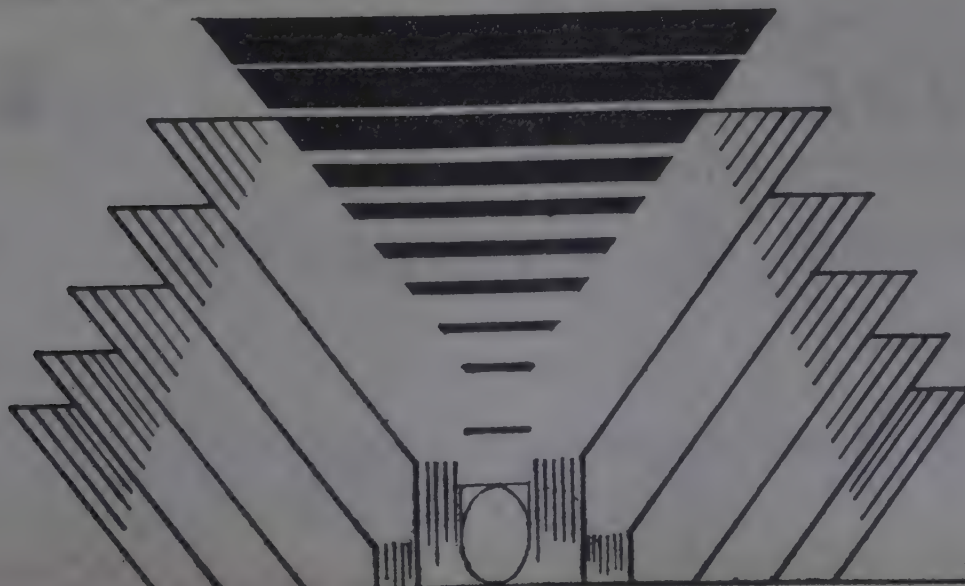
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Ferric chloride (Lumps)	5.50	Sodium sulphate (Fine)	6.00	Butyl stearate	36.00
(Anhydrous)	16.00	Sodium sulphate (Coarse)	5.00	Butanol	(Resale) 32+ST
Glue flakes	8.45	Sodium sulphide 50-52%		Benzyl Alcohol	60.00
Glue sheets	6.75	(Flakes)	11+ST	Benzyl chloride	34.00
Gohsenol GH-17	130+ST	Sodium sulphide 58-60%	(TCL) 19.00	Benzo trichloride	16.00
Hydro	42.50+ST	(Flakes)		Benzoyl chloride	22.00
Hyflosupercell	24+ST	Sodium sulphide pure (Flakes)	12.25	Bromine Liquid	78.00
Hexamine	(Resale) 40.00	Sodium nitrite	(Resale) 680.00	Chloroform	25+ST
Industrial Wax	25.00	Sodium chloride 80% (Spain)	80.00	Carbon Tetrachloride	17.00
Litharge	15.00	Soda Ash (Tata)	4.25	Cellosolve	47+ST
Lead Acetate (Tech)	31.25	Soda Ash (Birla)	4.00	Cyclohexanone	50+ST
Lithopone	18+ST	Soda Ash (Imp.)	4.00	Cyclohexanol	52+ST
Magnesium chloride (Crystal)	1.00	Soda Ash (Imp.)	3.50	Diacetone	(Resale) 35.00
Menthol crystal (Flakes) 330+Ex.+ST		Sodium bicarbonate	6.50	Diethyl Oxalate	34.00
Menthol bold	365+Ex.+ST	Sodium bisulphite	4.50	Diethylene glycol (DEG)	43+ST
Menthol crystal bold	395+Ex.+ST	Sodium silicate	3.00	Diethyl Phthalate	52.00
Magnesium carbonate (Japan)	16.00	Sodium acetate	6.25	Diallyl Phthalate	56.00
Magnesium carbonate (Indian)	15.00	Sodium alginate	160+ST	Dimethyl Phthalate	28.00
Malic Anhydride (per kg)		Titanium Dioxide (Anatase)	58+ST	Diethyl Adipate	52.00
(Resale)	48.00	Titanium Dioxide		Dibutyl Adipate	42.00
Mercury (175 lbs)	10,300.00	(Rutile — RCR_2)	80+ST	Dipentene	15.00
Nickel chloride	110.00	Tartaric acid (Crystal)	94.00	Dimethylamine 40%	12.00
Oxalic acid	(Resale) 22.00	Trisodium phosphate	4.80	Dimethylamine 60%	14.00
Peppermint oil		Thiourea	78+ST	Ethyl Acetate	24.00
(Rectified)	195+Ex.+ST	Urea (Tech)	2.75	Ethyl Acrylate	54.00
Potassium carbonate (Indian)	20.00	Zinc Dust	30.00	Ethylene Dichloride	11.00
Potassium carbonate (Imported)	24.00	Vacuum salt	1.00	Ethylene Glycol	43+ST
Potassium bichromate	23.00	Zinc Oxide	30.00	Formic Acid (Imp)	(Resale) 28.50
Potassium phosphate (Mono)	14.00	Zinc chloride powder		Formaldehyde	(Resale) 8.00
Potassium phosphate (Di)	14.00	(technical)	14.00	Glycerine (CP)	51.00
Polyvinyl alcohol (No. 117)	120+ST	Zinc sulphate	5.25	Glycerine (IW)	49.00
Polyvinyl alcohol (No. 173)				Hydrogen peroxide 50%	(Resale) 27.50
(Resale)	130+ST			Isopropyl Alcohol	21.00
Polyvinyl alcohol (No. 208)	150.00			Iso Butyl Alcohol	28.00
Paraformaldehyde (Resale)	23+ST				(Resale) 30.00
Phthalic anhydride 36%				Monosthanolamine	(Resale) 52.00
(Resale)	24.00			Melamine	43+ST
Pentaerythritol	(Resale) 48.00			Methyl Ethyl Ketone	48.00
Paraffin wax	(Resale) 14.50			Methyl Isobutyl Ketone	42.00
Rangolite (German)	50+ST			Methyl Acrylate	42.00
Rangolite (Czech.)	54+ST			Methyl Dichloride	(Resale) 23.00

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Phenol (Resale)	32.00
Propylene Glycol	38+ST
Polyethylene Glycol (No. 200)	39.00
Polyethylene Glycol (No. 400)	42.00
Polyethylene Glycol (No. 500)	42.00
Polyethylene Glycol (No. 1600)	14.00
Polyethylene Glycol (No. 4000)	38.00
Polyethylene Glycol (6000)	50.00
Para Cresol	40.00
Styrene monomer	48+ST
Sorbitol	16.00
Sulphuric Acid	2.10
Trichloroethylene	27.00
Triethanolamine (Resale)	49.00
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
Vinyl Acetate Monomer	43.50

SOLVENTS	Per Litre
Benzene	18.00
N-Heptane	11.00
H-Hexane	12.00
Methanol	9.00
Solvent Naphtha Heavy	10.50
Solvent Naphtha Light	8.50
Toluene	21.00
Xylene	22.00

DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)

Alphanaphthylamine	60.00
Alpha Naphthol (Imp.)	175.00
Aceto Acetic Ester (Methyl)	65.00
Ammonium Molybdate	200.00
Anthraquinone	100.00
Anthranilic Acid	65.00
2-Amino-4-Nitrophenol	150.00
Blue B. Base (Local)	230.00
Beta Naphthol (Atul)	65.00
Benzidine Dihydrochloride (BDH)	85.00
Bromamine Acid	400.00
BON Acid	140.00
Chicago Acid	300.00
Coach Acid	60.00
C. Acid (Imp.)	260.00
Cyanuric Chloride (Japan)	120.00
2, 4, DNCB	30.00
Dihydrothio PTOS (Imp)	600.00
Dimethyl Aniline	68.00
Diethyl Aniline	155.00
Diamino stilbene disulphonic acid	143.00
3, 3-DCB (Imp)	180.00
Gamma Acid (Atul)	180.00
H. Acid (Atul)	155.00
G. Salt	62.00
Isophthalic Acid	45.00
J. Acid	270.00
J. Acid Urea	300.00
K. Acid	105.00
MDPS (German)	190.00

MNA	160.00
Meta Ureido Aniline	150+Ex+Ta
MPD (Local)	220.00
MPD (Japan)	12.00
Naphthenic Acid	410.00
N-Methyl J. Acid	120.00
N-Methyl Aniline	23.00
Naphthalene (Refined)	87.00
Ortho Anisidine (OA Imp.)	11.25
Ortho Dichloro Benzene (ODCB)	105.00
OT Base	18.00
Para Dichloro Benzene (PDCB)	110.00
Para Anisidine (PA-Imp)	95.00
Para Anisidine (PA-Local)	72.00
PNA	335.00
Para Cresidine (Imp.)	150.00
Para Amino Azo Benzene (India)	33.00
PNCB	155.00
Para Amino Acetanilide	125.00
1-Phenyl 3-methyl-5-Pyrazolone	350.00
Phenyl J. Acid	170.00
Para Amino Benzoic Acid	93.00
PT Base	510.00
Rhoduline Acid	22.00
Resist Salt	150.00
Resorcinol	65.00
Sodium Naphthionate	64.00
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Sulpho Tobias Acid	18.00
Trichloro Benzene (TCB)	135.00
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(Prices as on October 18, 1988)

[illegible]

Delhi Market

DELHI : OCTOBER 7, (NNS) — Citric acid China quality recorded handsome gain of Rs. 400 at Rs. 2400 (per 50 kg.) in the Delhi chemicals market during last week, owing to brisk and sustained demand by consumers and stockists induced by fall in import from China and France, says NNS. It was also reported that about 150 tonnes of the commodity were transacted at the rate of Rs. 2500/2550 for March, April and May delivery 1989. Citric acid Bombay Dyeing hardened by Rs. 100 at Rs. 2500 due to fall in production. Tartaric acid recorded a sharp hike of Rs. 500 and touched a new peak of Rs. 6700 (per 50 kg.) in the absence of fresh import from France and continued demand by consumers.

Rangolite Germany looked up from Rs. 72 to Rs. 90 (per kg.) due to acute shortage of stocks and good demand by gur khandsari makers. Chatkolite jumped up by Rs. 4 at Rs. 58 per kg. on poor import from China. Sufolite also gained Rs. 2 at Rs. 59 on poor supply and good stockists demand. Soda hydro Damosha eased by rupee one at Rs. 41.50 (per kg.) caused by a reduction in its prices by

a manufacturer. Gulshan and Kalali Hydro softened by rupee one each. Hydro Tamilnadu moved up from Rs. 39.50 to Rs. 41.00 on tight stock position.

Soda ash moved up by Rs. 5 at Rs. 280 (per 50 kg.) caused by a hike in its prices by Rs. 10 per katta by manufacturers. Soda bicarb Tata quoted higher by Rs. 5 at Rs. 275. Paraffin wax went up by Rs. 15 at Rs. 705 (per 50 kg.) on poor inflow from Assam and higher demand by candle manufacturers. Stock position was also negligible. Menthol flake, medium and bold looked up from Rs. 405, Rs. 470 and Rs. 505 to Rs. 480, Rs. 535 and Rs. 575 per kg. due to negligible supply from U.P. and sustained demand by exporters and stockists. Mentha oil lost Rs. 20 at Rs. 380 and DMO was being offered lower at Rs. 240 against Rs. 260 per kg. thanks to fresh selling. Menthol flake for October delivery was stated at Rs. 520.

Hexamine jumped up by Rs. 3 at Rs. 35 on tight supply. Hydrogen peroxide quoted higher by Rs. 50/1.00 on poor inflow. Naphthalene balls rose by Rs. 25 at Rs. 1425 on seasonal demand.

No change was recorded in dyes and colours in thin trading.

(DELHI MARKET RATES AS ON OCTOBER 7, 1988)

Ammonium Bicarb (per 25 kg)	135.00	Boric acid Technical (per 50 kg)	1025.00
Mercury (per flask)	10,600.00	Paraffin wax (per 50 kg)	705.00
Soda ash (per bag)	290-310.00	Tartaric acid (per 50 kg)	6700.00
Ammonium chloride (per 50 kg)	125-180.00	Borax Granular (per 50 kg)	565.00
Caustic soda flakes (per 50 kg)	390-395.00	Borax Crystal (per 50 kg)	580.00
Citric Acid (per 50 kg)	2400-2500.00	Sodium Nitrate (per 50 kg)	430.00
Stable Bleaching Powder Shriram (per 25 kg)	95.00	Sodium Nitrite (per 50 kg)	650-700.00
Stable Bleaching Powder KCI (per 25 kg)	86.00	Camphor Powder (per kg)	92.00
Stable Bleaching Powder MODI (per 25 kg)	88.00	Camphor Thal (per kg)	102.00
Sod. Bicarbonate (per 50 kg)	275-280.00	Menthol Medium (per kg)	535.00
Sod. Hydro Sulphite (per kg)	37-43.50	Menthol Flakes (per kg)	480.00
Rangolite (per kg)	58-80.00	Menthol Bold (per kg)	575.00
		Glycerine (per kg)	47-48.00
		Sodium Silicate (per quintal)	200-250.00
		Hexamine (per kg)	35.00

Acetic Acid Glacial (per kg)	18-19.00
Copper Sulphate (per quintal)	2300-2500
Formic acid (per kg)	N.A.
Formaldehyde (per kg)	8.00
Hydrogen Peroxide (per kg)	26.50-29.00
Calcium Carbonate (per tonne)	2500-4000.00
Acid Slurry Soft (per kg)	24.00
Acid Slurry Hard (per kg)	32.00
Phosphoric Acid (per 50 kg)	900.00
Pot. Nitrate (per quintal)	900-1200.00
Pot. Permanganate (per 50 kg)	2300.00
Sod. Dichromate (per 50 kg)	1050-1150.00
Tri-Sod. Phosphate (per 50 kg)	350-380.00
Titanium Dioxide Anatase (per kg)	66.00
Titanium Dioxide RC-822 (per kg)	78.50
Zinc Oxide (per mt)	35,000-42,000.00
Phenol Carbolic Acid (per kg)	33.00
Carbon Tetrachloride (per kg)	21.00
Chloroform (per kg)	28.00
Sodium Sulphate (per 50 kg)	160-180.00
Naphthalene Balls (per 50 kg)	1425.00
DYES & COLOURS (per kg)	
Naphthol AS	158.00
Naphthol ASG	249.00
Naphthol ASBS	210.00
Naphthol ASTR	320.00
Naphthol ASOL	202.00
Naphthol ASBO	220.00
DIRECT DYES (per kg)	
Black E. Conc.	110-160.00
Diazo Black MT	105-130.00
Green B	100-127.00
Blue 2-B	60-92.00
Sky Blue FB	213.00
Basic Auramine	55-110.00
Basic Rhodamine	220-320.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	140-165.00
Acid Orange	45-88.00

Madras Market

The markets have remained quiet. There was a closure of market on 10.10.88 in sympathy with metal traders demands with Govt. Solvents prices are on the increase. Non-availability of petrochemical solvents have led to non-availability of scores of intermediates affecting production in

Dyes, Drugs etc. Further imported items are costing more due to exchange rate enhancements. There is a strong plea being made to the Govt. to adjust the import duties suitably to enable units to import their requirements economically.

(MADRAS MARKET RATE AS ON OCTOBER 8, 1988)

Acetic Acid Glacial (per kg)	18.75	Hydrosulphite of Soda — TCPL (per kg)	40.00
Aluminium Sulphate Iron Free (per MT)	1800.00	Hydrosulphite of Soda — IDI (per kg)	44.00
Ammonium Bicarbonate (per 25 kg)	125.00	Hydrosulphite of Soda — BASF (per kg)	45.00
Acid Slurry (Soft per kg)	28.00	Hydrogen Peroxide (per kg)	30.00
Ammonium Chloride SPIC (per MT)	2,800.00	Hyflo Supercell (per kg)	23.00
Bleaching Powder (per 25 kg bags)	110.00	Magnesium Carbonate (per kg)	18.00
Borax Granular (per 50 kg)	850.00	Potassium Bichromate (per kg)	26.00
Caustic Soda Flakes — Mettur Chemicals (per MT)	8,200.00	Phosphoric Acid (per kg)	19.00
Caustic Soda Flakes — Andhra Sugars (per MT)	8,200.00	Phthalic Anhydride (per kg)	24.00
Citric Acid (per kg)	48.00	Pentaerythritol (per kg)	52.00
Copper Sulphate (per 50 kg)	1,050.00	Paraffin Wax (per kg)	13.50
Cresylic Acid 98/99% (per kg)	87+ED	Oxalic Acid (per kg)	23.00
Meta Cresol 40/42% (per kg)	39+ED	Soda Ash — TAC (per 75 kg bags)	320.00
Para Cresol 98% (per kg)	67+ED	Soda Ash — TATA (per 75 kg bags)	325.00
Formic Acid (per kg)	27.00	Sodium Cyanide Indian (per kg)	55.00
Formaldehyde (per kg)	9.00	Sodium Cyanide (Degussa) (per kg)	85.00
Glycerine Carbonate (per kg)	50.00	Sodium Bichromate (per kg)	18.00
		Sodium Bicarbonate (per 50 kg bags)	295.00
		Sodium Nitrate (per 50 kg bags)	425.00

Sodium Nitrite (per 50 kg bags)	750.00
Sodium Silicate (per MT)	4500.00
Sodium Sulphate (per MT)	3,500.00
Sodium Sulphide Flakes (per MT)	13,500.00
Sodium Bisulphite (per 50 kg)	4,000.00
Stearic Acid (per kg)	30.00
Trisodium Phosphate (per 50 kg)	350.00
Titanium Dioxide — Indian (Rutile) (per kg)	62.00
Titanium Dioxide — Imported (Rutile) (per kg)	90.00
Urea Tech (per MT)	2800.00
Zinc Oxide (per kg)	34.00
Zinc Chloride Powder (per kg)	13.50
Zinc Sulphate (per MT)	5,000.00
Di-octyl Phthalate (per MT)	45,000.00
Dibutyl Phthalate (per MT)	45,000.00
Hexamine (per MT)	30,000.00

SOLVENTS

Acetone — HOCL — (per kg)	18.75
Acetone — NOCIL — (per kg)	21.00
Diacetone (per kg)	29.00
Diethyl Glycol (per kg)	52.00
Isopropyl Alcohol (per kg)	22.00
Butanol (per kg)	34.00
Benzene — SAIL — (per lit)	18.00
Toluene — SAIL — (per lit)	18.00
Xylene — SAIL — (per lit)	21.00
Phenol — HOCL — (per kg)	30.00
Turpentine (per lit)	16.50
Trichloroethylene — MCIC — (per kg)	24.00
Carbon Tetra Chloride (per kg)	17.00
Chloroform (per kg)	26.00
Methylene Chloride (per kg)	25.00
Methanol (per kg)	10.00
Methyl Ethyl Ketone (per kg)	50.00
Cellosolve (per kg)	52.00
Butyl Acetate (per kg)	40.00
Ethyl Acetate (per kg)	23.00
Triethanolamine (per kg)	24.00
Sorbitol (per kg)	35.00

MATERIALS IMPORTED

MADRAS

(From 1.7.83 to 31.7.88)

ALDEHYDE: From France: Rajalakshmi Perfumery Works, 500 kgs., Rs. 90,285; From FRG: Mudana Sons, 160 kgs., Rs. 38,674.

ALDEHYDE C1: From France: N. Ranga Rao & Sons, 135 kgs., Rs. 47,980.

ALPHA OLEFIN SULPHATE: From France: Chemicals & Plastics India Ltd., 36,000 kgs., Rs. 3,75,829.

ALLYL CHLORIDE: From Japan: Grauer & Weil (I) Ltd., 14,400 kgs., Rs. 3,36,097; GTZ (I) P. Ltd., 1,080 kgs., Rs. 25,349; From Netherlands: Platewell Process & Chemicals, 4,940 kgs., Rs. 1,45,460.

AMMONIUM PERSULPHATE: From FRG: IEL Ltd., 3,000 kgs., Rs. 53,343; Sarvodaya Chemical Works, 2,000 kgs., Rs. 44,290.

ANTIMONY TRIOXIDE: From Belgium: Devi Polymers P. Ltd., 1,000 kgs., Rs. 57,340.

ANTIMONY OXIDE: From Japan: Fenner India Ltd., 14,000 kgs., Rs. 6,05,782.

AROMATIC CHEMICALS: From France: Bharat Indl. Corpn., 3,000 kgs., Rs. 4,99,289; Mysore Agarbathi Co-op. Soc., 3,000 kgs., Rs. 4,62,971; From FRG: B. V. Aswathiah & Bros., 180 kgs., Rs. 21,354; Chemical Engg. Corpn. Ltd., 25 kgs., Rs. 11,600; The Mysore State Agarbathi Manuf. Co-op. Soc. Ltd., 141 kgs., Rs. 77,507; Shri Rathod Trading Co., 245 kgs., Rs. 83,215; Vasu Agarbathis, 75 kgs., Rs. 41,464; From Japan: The Mysore Agarbathi Soc., 555 kgs., Rs. 1,66,700.

From USA: Sunrise Chemical Industries, 215 kgs., Rs. 29,466.

BETA HYDROXY ETHYL HYDRAZINE: From Netherlands: Eskayef Ltd., 5,000 kgs., Rs. 5,54,765.

BIO CHEMICALS: From FRG: Central Food Tech. Res. Inst., 17 Nos., Rs. 19,304; From UK: H Chandanmal & Co., 3.93 kgs., Rs. 11,871.

BISPHENOL A: From Brazil: SIP Resins Ltd., 80,500 kgs., Rs. 15,45,165.

BUTACHLOR TECH: From USA: Tropical Agrosystems Pvt. Ltd., 15,872 kgs., Rs. 6,75,550.

BUTYL BUTYROLACTATE: From UK: Robin Chemicals Pvt. Ltd., 15 kgs., Rs. 23,571.

CARBON BLACK: From Korea: MRF Ltd., 287 MTs., Rs. 25,53,749; From Switzerland: Associated Paint Inds., 10 kgs., Rs. 759; From USA: MRF Ltd., 79,833 kgs., Rs. 9,64,404.

CELLULOSE ACETATE BUTYRATE: From Japan: CDC Carboline India Pvt. Ltd., 100 lbs., Rs. 3,461.

CHEMICALS: From FRG: UB Mec. Batteries Ltd., 1,200 kgs., Rs. 57,894.

3 CHLORO 4 FLUORO ANILINE: From Japan: Dr. Reddy's Labs. Ltd., 2,000 kgs., Rs. 7,82,362.

2 CHLORO PROPIONIC ACID: From UK: Standard Organics Ltd., 1,000 kgs., Rs. 86,771.

CHLOROPHYLL: From UK: Eskayef Ltd., 5 kgs., Rs. 20,145.

CHOLINE CHLORIDE: From FRG: Tetragon Chemie Ltd., 18,000 kgs., Rs. 2,25,320.

CINNAMIC ALDEHYDE: From FRG: The Mysore State Agarba

thi Mfg. Co-op. Soc., 2,000 kgs., Rs. 1,14,679.

CYCLOHEXANONE: From FRG: Amalgamated Chemicals Ltd., 14,820 kgs., Rs. 2,43,177; From Italy: K. P. Industries, 14,440 kgs., Rs. 2,33,378; From Singapore: Prakash Pipes & Inds., 13,680 kgs., Rs. 3,52,216.

CYCLOPENTA DECANOLIDE: From FRG: Padmini Products, 1 kgs., Rs. 44,660.

CYSTEAMINE HYDROCHLORIDE: From Japan: Eskayef Ltd., 900 kgs., Rs. 1,26,942.

DESMODUR: From FRG: Shree Ram Polyplast, 1,200 kgs., Rs. 74,027.

DESMODUR R: From FRG: Lakotia Beltings P. Ltd., 105 kgs., Rs. 16,942.

DESMODUR TT: From FRG: Madura Coats Ltd., 600 kgs., Rs. 1,35,093.

DESMOPHEN: From FRG: Shreeram Polyplast, 195 kgs., Rs. 12,800.

DIALLYL PHTHALATE: From Japan: Hyderabad Connectronics Ltd., 1,000 kgs., Rs. 1,39,984.

DIBENZYL OXY ACETO PHENONE: From Netherlands: Astra IDL Ltd., 250 kgs., Rs. 3,43,162.

DIETHYLENE GLYCOL: From Japan: Meta Tex Exports, 18,800 kgs., Rs. 1,33,716.

DIHYDRIC PHENOL: From Japan: CDC Carboline India Ltd., 55 Lbs., Rs. 2,262.

DIMETHYL CARBONATE: From France: IEL Ltd., 2,800 kgs., Rs. 89,587.

DIMETHYL DICHLORO SILANE: From USA: Astra Research Centre (India), 0.35 ltr., Rs. 504.

DIMETHYL SILOXANE POLYMER: From Japan: CDC Carboline India P. Ltd., 45 Lbs., Rs. 2,908.

DL METHIONINE: From Japan: SKMS Energy Animal Feeds Pvt. Ltd., 4,000 MTs., Rs. 1,80,808.

EPICHLOROHYDRINE: From Japan: SIP Resins Ltd., 60,000

kgs., Rs. 15,64,621; From Japan: Veeyors Polymers P. Ltd., 2,400 kgs., Rs. 61,929.

ERYTHROMYCIN THIOCYANATE: From USA: Pradeep Drug Co., 2,158 kgs., Rs. 18,34,982.

ETHANE: From Japan: Electronics Research P. Ltd., 582 kgs., Rs. 12,698.

ETHYL ACID PHOSPHATE: From Japan: CDC Carboline India P. Ltd., 100 Lbs., Rs. 3,286.

ETHYL BUTYRATE: From UK: The Flavours India P. Ltd., 540 kgs., Rs. 36,943.

ETHYL CELLULOSE: From Japan: CDC Carboline India Pvt. Ltd., 100 Lbs., Rs. 10,467; From USA: Motor Inds. Co. Ltd., 1,607 MTs., Rs. 2,04,149; The Mysore Lamp Works Ltd., 295 kgs., Rs. 44,346.

ETHYL CYANO ACRYLATE: From FRG: Darien Electric, 47.5 kgs., Rs. 33,157.

ETHYL HEXYL GLYCIDYL ETHER: From Japan: CDC Carboline India P. Ltd., 820 Lbs., Rs. 30,784.

EUGENOL: From Singapore: Maschmeijer Aromatics (I) Ltd., 25 kgs., Rs. 2,490.

FORMIC ACID: From Belgium: Khaleerpur Rahman & Co., 390 kgs., Rs. 4,493.

FORMIC ACID TECH. 85%: From Belgium: Khaleerpur Rahman & Co., 1,990 kgs., Rs. 22,800.

FURFURYL ALCOHOL: From Belgium: Coromandel Prodorite Ltd., 6,000 kgs., Rs. 1,45,092.

GALLIC ACID: From Japan: Standard Organics Ltd., 1,000 kgs., Rs. 86,771.

GAMMA FERRIC OXIDE: From FRG: Audio Electronic P. Ltd., 1,000 kgs., Rs. 80,671; From Singapore: Prakash Pipes & Inds.

GENTAMYCIN SULPHATE: From China: Jasmika Enterprises, 130 kgs., Rs. 3,15,307.

GUM BENZOIN: From China: Rasiklalbarai & Co., 1,362 kgs., Rs. 17,819; From Singapore: Rasiklai Barai & Co., 4,170 kgs., Rs. 74,430; S. P. K. Muniswaran, 1,356 kgs., Rs. 30,707; S. P. K. M. Rajamani, 1,271 kgs., Rs. 21,745; Union Trading Co., 1,361 kgs., Rs. 17,806; Universal Enterprises, 886 kgs., Rs. 12,038.

GUM ROSIN: From China: Ambica Chemical Products, 51,300 kgs., Rs. 3,62,008.

HEDIONE: From FRG: N. Ranga Rao & Sons, 200 kgs., Rs. 81,293; Padmini Products, 400 kgs., Rs. 1,71,505.

HELIOTROPIN: From Japan: Padmini Products, 270 kgs., Rs. 93,966.

HYDROXY ETHYL CELLULOSE: From Japan: CDC Carboline India Ltd., 1,400 Lbs., Rs. 61,811; From Singapore: CDC Carboline (India) P. Ltd., 600 Lbs., Rs. 25,178.

HYDROXY PROPYL CELLULOSE: From Japan: CDC Carboline India P. Ltd., 100 Lbs., Rs. 9,003.

HYDROSULPHATE CONC: From FRG: Allchems, 15,000 kgs., Rs. 1,77,738; Tivee Agents, 5,000 kgs., Rs. 59,246.

HYDROSULPHITE CONC.: From FRG: Allchems, 20,000 kgs., Rs. 2,36,984; Devichand, 10,000 kgs., Rs. 18,492; Gandhi Brothers, 10,350 kgs., Rs. 1,18,492.

IMINO BENZYL CARBAMYL CHLORIDE: From France: Chemet, 10 kgs., Rs. 550.

IMINODIBENZYL MPC: From FRG: Meridian Pharmls. P. Ltd., 2 kgs., Rs. 157.

ISOBORNYL CYCLOHEXANOL: From France: Bharat Indl.

ISOBUTYL BENZENE: From USA: Chandra Pharmaceutical Ltd., 81.942 MTs., Rs. 34,11,747; Shasun Drugs, 13,657 kgs., Rs. 5,88,630.

ISOPHTHALIC ACID: From Japan: Naphtha Resins & Chemical P. Ltd., 17.5 MTs., Rs. 2,56,401.

ITACONIC ACID: From USA: Indian Syntans (P) Ltd., 1,300 kgs., Rs. 65,647.

L-LYSINE HYDRO CHLORIDE: From Japan: Tetragon Chemie P. Ltd., 3.6 MTs., Rs. 1,28,208.

LAB CHEMICALS: From Belgium: Kasturba Medical College, 106 Nos., Rs. 73,232; From FRG: Saryodaya Chemical Works, 39 kgs., Rs. 8,612; From USA: Astra Res. Centre, 36.2 kgs., Rs. 1,155.

LAURYL PEROXIDE: From FRG: D.C.W. Ltd., 6 MTs., Rs. 4,81,648.

LEAD DIOXIDE DISPERSION: From USA: L&T Mcneil Ltd., 1, No., Rs. 5,508.

LILADOX: From FRG: DCW Ltd., 2,000 kgs., Rs. 3,70,134.

LINALOOL: From France: Padmini Products, 500 kgs., Rs. 60,347; From USA: Mysore Sugandhi Dhoop Factory, 394 kgs., Rs. 84,580; Reliable Inds., Syndicate, 907 kgs., Rs. 84,507; Sri Amar Trading Co., 1,314 kgs., Rs. 1,89,380.

LINALYL ACETATE: From FRG: Karnataka Soaps & Detergents Ltd., 540 kgs., Rs. 74,278.

LITHIUM CARBONATE: From FRG: Tribology India Ltd., 500 kgs., Rs. 30,607.

LIVIKSOL K 30 USP: From FRG: Eskayef Ltd., 1,800 kgs., Rs. 2,24,927.

MANGANESE CARBONATE: From Japan: Hilversum Electronics, 2,048 kgs., Rs. 58,689.

2-MERCAPTOBENZIMIDAZOLE: From Japan: Shriram Fibres Ltd., 1,750 kgs., Rs. 1,18,492.

METHYL ACETO ACETATE: From USA: Vani Organics, 13,076 kgs., Rs. 2,66,287.

METHYL CELLULOSE: From Japan: Tablets (India) Ltd., 5 kgs., Rs. 1,616.

METHYL ETHYL KETONE: From France: Supariwala Exports, 13,200 kgs., Rs. 1,68,990; From Singapore: Royal Cushion Vinyl Prdt. P. Ltd., 11,220 kgs., Rs. 1,99,502; Soparwala Exports, 26.4 Mts., Rs. 3,37,980; Tony Electronics P. Ltd., 25.74 MTs., Rs. 4,39,374; From Taiwan: Rao Insulating Co. P. Ltd., 495 kgs., Rs. 11,660.

METHYL ISOAMYL KETONE: From Japan: CDC Carboline India P. Ltd., 375 Lbs., Rs. 5,040.

METHOXY ETHYL PHENOL: From Japan: Meridian Pharmls. P. Ltd., 100 kgs., Rs. 1,28,319.

MONOCROTOPHOS TECH 79%: From Switzerland: Gujarat Agro Inds., 16,280 kgs., Rs. 12,22,736.

MONOETHYLENE GLYCOL: From Saudi Arabia: Indian Organic Chemicals Ltd., 2093.839 Rs. Rs. 2,52,07,895; From Singapore: Aurochem Chemicals, 18.8 MTs., Rs. 2,10,958.

MONOSODIUM GLUTAMATE: From Indonesia: Sreenivas Chemical Inds., 2,000 kgs., Rs. 36,231; From Singapore: Mittulaul Lalah Sons, 150 kgs., Rs. 7,560; Rajendra Enterprises, 6,000 kgs., Rs. 2,81,792.

NAPHTHALENE: From FRG: Southern India Chemicals Inds., 32,400 kgs., Rs. 2,78,374.

NAPHTHALENE CRUDE: From Canada: India Syntans P. Ltd., 15,000 kgs., Rs. 1,23,755.

N-METHYL PYROLIDONE: From FRG: Shriram Fibres Ltd., 1.05 MTs., Rs. 60,952.

NEO PENTYL GLYCOL: From FRG: Clinfield India (P) Ltd., 5,000 kgs., Rs. 1,19,159; Dr.

Reddy's Labs Ltd., 5,000 kgs., Rs. 1,24,625.

ORPHENADRINE HCL: From Switzerland: Tamilnadu Dadha Pharm Ltd., 100 kgs., Rs. 99,810.

ORTHOXYLENE: From Netherlands: Thirumalai Chemicals Ltd., 2998.406 Mts., Rs. 1,58,23,718.

PARA HYDROXY ACETO PHE-NONE: From FRG: Newland Labs., Ltd., 1,500 kgs., Rs. 3,14,766.

PARA HYDROXY PHENYL ACETAMIDE: From Japan: Meridian Pharmls. P. Ltd., 180 kgs., Rs. 1,32,667.

PARA TERTIARY BUTYL PHENOL: From Japan: Reichhold Chemicals India Ltd., 10,000 kgs., Rs. 2,18,350.

PHENTHOATE: From Italy: Tropical Agrosystems, 8,000 kgs., Rs. 5,52,652.

PHOSPHORIC ACID: From USA: Madras Fertilisers Ltd.,

13,975 MTs., Rs. 8,01,85,958.

PIPERIDINE: From Japan: Dr Reddy's Labs Ltd., 1190 kgs., Rs. 1,77,738.

POLYACETAL: From FRG: Keltron Counters Ltd., 400 kgs., Rs. 22,722.

POLYETHYLENE GLYCOL: From USA: National Carbon Co., 459 kgs., Rs. 1,12,042.

POLY TETRA METHYLENE ADIPATE: From USA: Urethanes India Ltd., 42,128 kgs., Rs. 12,02,513.

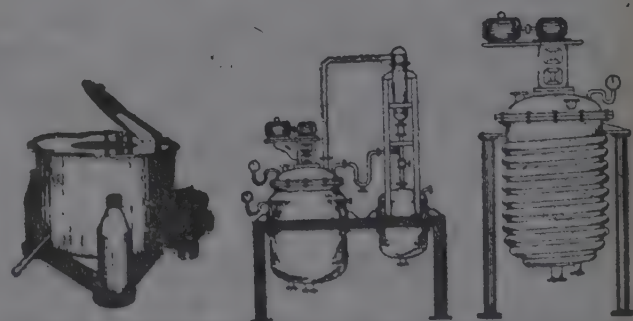
POTASSIUM SILICATE SOLUTION: From France: Suchitra Teletubes Ltd., 36 MTs., Rs. 2,93,025.

POTASSIUM THIOCYANATE: From FRG: Hindustan Photo Films Mfg. Co. Ltd., 112.3 kgs., Rs. 26,016.

PROPARGYL ALCOHOL: From FRG: Agromore Ltd., 190 kgs., Rs. 21,650.

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PROPIONYL CHLORIDE: From FRG: Dr. Reddy's Labs., Ltd., 14.82 MTs., Rs. 6,89,002.

PROPYLENE OXIDE : From FRG: Neuland Labs., 1,600 kgs., Rs. 4,55,893.

PYRIDINE: From Belgium: IEL Ltd., 15,200 kgs., Rs. 7,69,729.729.

SODIUM BORATE CRUDE: From Turkey: STC India Ltd., 1,500 MTs., Rs. 65,28,766.

SODIUM FORMATE: From Italy: Tamilnadu Chemical Products Ltd., 200 MTs., Rs. 8,05,120.

SODIUM METAL: From France: Dakshin Pharmaceuticals, 7,992 kgs., Rs. 2,63,747; From Japan: Metro Exporters, 9.86 MTs., Rs. 3,33,809; Priya Chemicals, 4.03 MTs., Rs. 1,36,435.

SODIUM SULPHOXYLATE : From Czechoslovakia: Mangal Textiles, 12 MTs., Rs. 1,81,152.

SODIUM TETRABORATE : From Japan: CDC Carboline India P. Ltd., 200 Lbs., Rs. 1,778.

STANNOUS OCTOATE CATALYST: From Switzerland: Joy Foam P. Ltd., 200 kgs., Rs. 38,437.

STYRENE MONOMER: From Japan: Emkay Indl. Corpn., 43,200 kgs., Rs. 5,75,649; Essel International, 14.44 MTs., Rs. 1,95,135.

SYN. ALUMINIUM SILICATE: From Japan: Tablets (India) Ltd., 5 kgs., Rs. 1,268.

TANTALUM PENTOXIDE : From Australia: Widia (India) Ltd., 150 kgs., Rs. 1,66,903.

TETRAHYDROFURAN : From Singapore: Prakash Pipes & Industries Ltd., 1306.68 kgs., Rs. 4,36,694.

THIO UREA: From Taiwan: Rao Insulating Co. P. Ltd., 100 kgs., Rs. 5,753.

TRIMETHOXY BENZALDEHYDE: From Netherlands: Inventa Chemical P. Ltd., 7,000 kgs., Rs. 23,30,012;

Prasad Drugs P. Ltd., 4.25 MTs., Rs. 13,65,084.

TRIMETHOXY ORTHO ACETATE: From Japan: Bharat Pulverising Mills, 400 kgs., Rs. 45,519.

TRIMETHYL CHLORO SILANE: From USA: Benzex Labs., Ltd., 10,614 kgs., Rs. 9,20,987.

TRIMETHYL PHOSPHATE : From USA: Indag Products Ltd., 14,651 kgs., Rs. 4,66,212.

TRIMETHYLOL PROPANE : From Japan: CDC Carboline India P. Ltd., 9 Lbs., Rs. 193.

TOLUENE: From Singapore: Prakash Pipes & Inds., Ltd., 9,000 kgs., Rs. 61,451.

VANILLIN: From France: The Mysore State Agarbathi Mfrs Co-op. Soc. Ltd., 3,000 kgs., Rs. 5,78,236.

VANILLIN TECH: From Norway: Dr. Reddy's Labs., P. Ltd., 12,000 kgs., Rs. 20,05,688.

VIT A ACETATE: From FRG: Shriram Fibres Ltd., 875 kgs., Rs. 2,59,679.

ZINC OXIDE: From Japan: W.S. Inds. India Ltd., 5,000 kgs., Rs. 1,47,250.

ZINC OXIDE POWDER: From Japan: WS Inds. India Ltd., 5,000 kgs., Rs. 1,48,019.

ZINC OXIDE: From UK: Fenner India Ltd., 4,000 kgs., Rs. 83,396.

PLASTIC MATERIALS IMPORTED MADRAS

(From 1.7.88 to 31.7.88)

ACETAL COPOLYMER: From Japan: Hyderabad Connectronics Ltd., 300 kgs., Rs. 15,149.

BUTADIENE HOMOPOLYMER: From Japan: CDC Carboline India Pvt. Ltd., 30 Lbs., Rs. 905.

CAPROLACTAM: From FRG: Shriram Fibres Ltd., 564.808 MTs., Rs. 1,50,82,344; From Italy: Shriram Fibres Ltd., 229.6

EPOXY RESINS: From Belgium: PCC Potentiometers Ltd., 40 kgs., Rs. 21,940; From Hong Kong: BPL Systems & Products Ltd., 1,667 kgs., Rs. 82,030; From Japan: Suchitra Teletubes Ltd., 400 kgs., Rs. 65,500; From Korea: Suchitra Components, 8,155.5 kgs., Rs. 4,84,744; From Japan: Suchitra Electronics Pvt. Ltd., 5,200 kgs., Rs. 2,64,065; From Singapore: Electronics Res. Pvt. Ltd., 1,180 kgs., Rs. 65,272; From Switzerland: W. S. Industries (India) Ltd., 25.2 kgs., Rs. 19,347.

LDPE: From Singapore: Safe-pack Plastics Pvt. Ltd., 16.5 MTs., Rs. 3,26,752; From USA: Safepack Plastics Pvt. Ltd., 16 MTs., Rs. 1,79,864.

HDPE: From Brazil: Sri Manjunatha Poly Fibres & Packers P. Ltd., 16.5 MTs., Rs. 3,61,734; From France: Sree Karthikeya Inds., 12.5 MTs., Rs. 2,15,852; From Japan: Bhagvathi Packaging Systems, 15 MTs., Rs. 3,29,052; Sumitra Plastics Ltd., 85,000 kgs., Rs. 17,32,415; From Saudi Arabia: Homeplast Inds. P. Ltd., 17,150 kgs., Rs. 3,15,126; Sam Plastics & Films, 17.15 kgs., Rs. 3,40,316; From Singapore: Mani & Co., 16.5 MTs., Rs. 3,53,649; M. V. Subramanian 33 MTs., Rs. 7,26,657; Rasi Exports Pvt. Ltd., 48,000 kgs., Rs. 9,70,927; From Yugoslavia: Shah Kundanmal Misrimal, 16,000 kgs., Rs. 1,54,820.

HDPE GRANULES: From Brazil: Kabini Poly Bags Pvt. Ltd., 16,500 kgs., Rs. 3,61,484; Lucky Cold Pvt. Ltd., 16,830 kgs., Rs. 3,61,734; From Japan: SPIC, 1,00,000 kgs., Rs. 22,58,408; Super Polytex Pvt. Ltd., 10,000 kgs., Rs. 1,23,036; From Saudi Arabia: Padinjerekar Rubber Works, 17,150 kgs., Rs. 3,22,

POLYCARBONATE RESIN:

From Japan: Hyderabad Electronics Ltd., 1,000 kgs., Rs. 46,942.

POLYETHYLENE GRANULES:

From Saudi Arabia: Ganesh Plastic Industries, 17.15 MTs., Rs. 3,32,997.

POLYMERIC ISOCYANATE:

From Japan: Madura Coats Ltd., 500 kgs., Rs. 56,688.

POLYPROPYLENE:

From FRG: Amalgamated Chemicals P. Ltd., 14.82 MTs., Rs. 2,43,177; From Singapore: Ananth Plastics Pvt. Ltd., 16,500 kgs., Rs. 3,40,327; Arun Poly Print, 16,500 kgs., Rs. 3,33,286; Kohinoor Polymers, 16.5 MTs., Rs. 3,33,285; Pandian Polymers Pvt. Ltd., 16.5 MTs., Rs. 3,40,327; S. G. Industries, 16.5 MTs., Rs. 3,40,357.

POLYVINYL ALCOHOL POWDER:

From USA: High Energy Batteries India Ltd., 250 Lbs., Rs. 30,738.

POLYVINYL BUTYRAL RESIN:

From FRG: Lakshmi Packaging Pvt. Ltd., 390 kgs., Rs. 37,912.

PROPYLENE CARBONATE:

From Japan: CDC Carboline India Pvt. Ltd., 51 Lbs., Rs. 1,126; From USA: Bush Boake Allen (India) Ltd., 33,540 kgs., Rs. 4,31,774.

PROPYLENE GLYCOL:

From USA: Naphtha Resins & Chemicals Ltd., 17,200 kgs., Rs. 1,95,733.

PVC RESIN:

From Austria: Printer Pvt. Ltd., 18 MTs., Rs. 3,48,099; From Korea: Fenner India Ltd., 15 MTs., Rs. 3,05,980; From Yugoslavia: Espi Plastics Pipes Inds., 50,000 kgs., Rs. 7,61,703; From Yugoslavia: Nandi Pipes Pvt. Ltd., 180 MTs., Rs. 27,27,319; Polytrusions Pvt. Ltd., 45 MTs., Rs. 6,92,006; Syndicate Bank, 25,000 kgs., Rs. 3,83,481; UB MEC Batteries Ltd., 10,200 kgs., Rs. 1,50,684.

PVC RESIN SUSPENSION

GRADE: From Yugoslavia: Hycount Plastic & Chemicals 50,000 MTs., Rs. 6,51,872.

**DRUG MATERIALS IMPORTED
MADRAS**

(From 1.7.88 to 31.7.88)

AMPICILLIN SODIUM STERILE: From USA: TTK Chemicals Ltd., 200 kgs., Rs. 3,39,223.

CIMETIDINE USP: From Hungary: Kanpha Labs., 20 Nos., Rs. 3,25,088.

DEXAMETHASONE: From Netherlands: Tablets India Ltd., 525 grams., Rs. 18,415.

DEXAMETHASONE BASE: From Netherlands: Tablets India Ltd., 125 pcs., Rs. 7,051.

LOPERAMIDE HCL USP: From Italy: Citadel Fine Pharmaceuticals, 10 kgs., Rs. 1,05,979.

MORPHOLINE: From FRG: Saveria Labs. Pvt. Ltd., 7.8 MTs., Rs. 2,02,402; From USA: Plant Organics Ltd., 2,090 kgs., Rs. 66,588.

TRIAMTERENE BP: From Switzerland: Eskayef Ltd., 1,000 kgs., Rs. 4,57,807.

**MATERIALS EXPORTED
MADRAS**

(From 1.7.88 to 31.7.88)

AROMATIC CHEMICALS: To London: Bush Boake Allen Ltd., 10 kgs., Rs. 4,065.

CARBOLIC ACID: To Colombo: Hataria Export Import Inc., 1,125 kgs., Rs. 35,062.

CAUSTIC SODA FLAKE: To Colombo: Kothari Indl. Corpn. Ltd., 2,70,000 kgs., Rs. 17,14,500.

CHLOROFORM: To Colombo: Hataria Export Import Inc., 325 kgs., Rs. 11,037.

OXYCHLORAMIDE: To London: I.E.L. Ltd., 2,300 kgs., Rs. 19,10,000.

PHENOL: To Port Kelang: HCL Ltd., 99,975 kgs., Rs. 14,83,720.

**DRUG MATERIALS EXPORTED
MADRAS**

(From 1.7.88 to 31.7.88)

AMMONIUM BICARBONATE BP: To Colombo: Medopharm, 1,050 kgs., Rs. 9,280.

DRUGS: To Colombo: Medopharm, 265 kgs., Rs. 37,712.

EPHEDRINE: To Monrovia: Ranka Pharmaceuticals Pvt. Ltd., 756 kgs., Rs. 3,00,000.

ERYTHROMYCIN ESTOLATE: To Copenhagen: Pradeep Drug Co., 750 kgs., Rs. 6,66,271.

SULPHAMETHOXAZOLE: To Hamburg: Standard Organic Ltd., 8,500 kgs., Rs. 18,71,114; To Singapore: Plant Organics Ltd., 150 kgs., Rs. 39,288; To Hamburg: SIRIS Ltd., 28,000 kgs., Rs. 67,29,760.

**DYE MATERIALS IMPORTED
MADRAS**

(From 1.7.88 to 31.7.88)

BROMOPHENOL BLUE: From Taiwan: Rao Insulating Co. Pvt. Ltd., 28.35 gms., Rs. 376.

BROMOCRESOL PURPLE: From Taiwan: Rao Insulating Co. Pvt. Ltd., 28.35 grams, Rs. 434.

DYESTUFFS: From Switzerland: Chemcrown Ltd., 25 kgs., Rs. 9,800.

ERIOCHROME BLACK: From Taiwan: Rao Insulating Co. Pvt. Ltd., 28.35 gms., Rs. 235.

LUCANIL BROWN R: From FRG: Sarup Tanneries Pvt. Ltd., 200 kgs., Rs. 37,037.

PIGMENT MAROON PP 4413: From UK: Tata Exports Ltd., 300 kgs., Rs. 17,993.

SANDOCRYL BLACK B: From FRG: Chemcrown (India) Ltd., 270 kgs., Rs. 59,157.

SAVINYL BLUE: From France: Tata Exports Ltd., 20 kgs., Rs. 12,094.

SAVINYL BROWN: From France: Tata Exports Ltd., 25 kgs., Rs. 18,330.

SAVINYL RED: From France: Tata Exports Ltd., 25 kgs., Rs. 20,492.

DYE MATERIALS EXPORTED MADRAS

(From 1.7.88 to 31.7.88)

ULTRAMARINE: To Odessa: Ultramarine & Pigments Ltd., 107.52 kgs., Rs. 20,84,812.

ULTRAMARINE BLUE: To Abidjah: Ultramarine & Pigments Ltd., 10,500 kgs., Rs. 2,76,000; To Dakar: Ultramarines & Pigments Ltd., 10,500 kgs., Rs. 2,76,000.

MATERIALS EXPORTED BOMBAY

(From 1.5.88 to 14.5.88)

ALUMINIUM CHLORIDE: To Felixstowe: Kline Chemicals Pvt. Ltd., 19,800 kgs., Rs. 2,67,000.

ALUMINIUM CHLORIDE ANHYDROUS: To Felixstowe: Mangalam Inorganics P. Ltd., 59,600 kgs., Rs. 480,363.

ALUMINIUM CHLORIDE POWDER: To Felixstowe: Mangalam Inorganics P. Ltd., 16,000 kgs., Rs. 1,94,331.

2-AMINO BUTANOL: To Genoa: Lupin Laboratories Ltd., 1,620 kgs., Rs. 6,64,000.

m-AMINO PHENOL: To Hamburg: Manekchand Panachand Trading, 4,000 kgs., Rs. 5,88,790.

ANTHRANILIC ACID: To Antwerp: Vivid Exports, 2,000 kgs., Rs. 1,00,511.

ANTHRAQUINONE: To Genoa: Mangalya Trading & Investments, 15,000 kgs., Rs. 7,22,100; To London: Mangalya Trading & Investments, 15,000 kgs., Rs. 7,15,000. Aromatic Chemicals: To Colombia: Goldensun

Mfg. Co., 445 kgs., Rs. 44,600.

BORAX DECAHYDRATE: To Colombo: Borax Morarji Ltd., 10 MTs., Rs. 54,660.

CHLORANIL: To Hamburg: Western Chemical Co., 3,000 kgs., Rs. 2,54,342; To Rotterdam: Methoxy Chemicals P. Ltd., 3,000 kgs., Rs. 2,28,600.

DEHYDRATED CASTOR OIL, FATTY ACID: To Hamburg: Jayant Oil Mills, 31,480 MTs., Rs. 4,98,361.

DELTAMETHRIN: To Rotterdam: M. J. Exports P. Ltd., 25,200 kgs., Rs. 2,89,80,000.

DEXTROPROPOXYPHENE HCL: To Hamburg: Wockhardt Ltd., 150 kgs., Rs. 1,35,649.

1,4, DIAMINO ANTHRAQUINONE: To Yokohama: IDI Ltd., 2,150 kgs., Rs. 4,14,639.

DIAMINO STILBENE DISULPHONIC ACID: To Shanghai: Sharda International, 5,050 kgs., Rs. 4,94,000.

2,5-DICHLOROANILINE: To Liverpool: International Market Movers, 2,160 kgs., Rs. 1,03,180.

DICHLORO SULFO PHENYL METHYL PYRAZOLONE: To Genoa: Priya Chemicals, 3,166 kgs., Rs. 2,57,123.

DIMETHYL AMINO ETHYL CHLORIDE: To Hamburg: Mentor Chemicals & Pharm. P. Ltd., 2,500 kgs., Rs. 44,204.

ENDOSULFAN TECH: To Rotterdam: Excel Industries Ltd., 26,400 kgs., Rs. 21,59,305.

FERROUS FUMARATE: To Hamburg: Associated Chemo Pharma P. Ltd., 3,000 kgs., Rs. 75,212.

GUM ACACCIA: To Rangoon: Premcem Gums P. Ltd., 21,000 kgs., Rs. 1,26,000; To Tilbury: Premcem Gums P. Ltd., 5,500 kgs., Rs. 33,000.

GUM GUAR: To Barcelona: Sarda Gums & Chemicals, 60 MTs., Rs. 17,49,672; Vikas Chemie Gums, 60 MTs., Rs. 17,30,013; To Bergamo: Indian Gum Industries, 96,000 kgs., Rs. 32,99,870; To Easton: Premcem Gums P. Ltd., 20,000 kgs., Rs. 7,40,000; To Hamburg: Ambika Brothers, 20 MTs., Rs. 7,73,263; To Hamburg: Sanjay Corpn., 1,00,000 kgs., Rs. 30,95,255; To Houston: Gum Industries Ltd., 20,000 kgs., Rs. 3,22,412; To La Spezia: Shree Mahalaxmi Corpn., 20,000 kgs., Rs. 6,02,883; Vikas Chemo-Gums, 40 MTs., Rs. 11,53,342; To Ravenna: Shiv Enterprises, 20,000 Rs. 4,54,473.

HYDROCHLORIC ACID: To Dubai: Chemco Drilling Fluid P. Ltd., 1,00,000 kgs., Rs. 2,57,850.

IRON OXIDE: To Mombasa: Rupa Exports, 21,000 kgs., Rs. 24,000.

KETONE: To Bangkok: Camphor & Allied Products Ltd., 380 kgs., Rs. 89,640.

MAGNESIUM TRISILICATE: To Tema: Mazda Intl. P. Ltd., 9,300 kg Rs. 2,29,794.

MALATHION TECHNICAL: To Marseilles: Ficom Organics Ltd., 54 MTs., Rs. 14,42,538.

MANGANESE DIOXIDE: To Manchester: Oxides Exports India, 20,000 kgs., Rs. 1,50,000.

METANILIC ACID: To Keelung: Sadhana Nitro Chem Ltd., 3,000 kgs., Rs. 98,200.

META NITRO BENZENE: SULFONIC ACID SODIUM SALT: To New York: Sadhana Nitro Chem Ltd., 18,000 kgs., Rs. 3,38,950.

NAPHTHOL: To New York: Amar Dye Chem Ltd., 8,000 kgs., Rs. 7,88,563.

NEVILLE & WINTHERS ACID: To Genoa: Priya Chemicals, 1,560 kgs., Rs. 1,25,785.

NICOTINE : To Le Havre : Nicosulf Industries & Exports, 2,000 kgs., Rs. 2,85,714.

NICOTINE SULPHATE : To Yokohama : Urvakunj Nicotine Inds., 14,850 kgs., Rs. 6,39,000

6-NITRO-1-DIAZO-2-NAPHTHOL-4-SULPHONIC ACID: To Liverpool: State Chem P. Ltd., 3,333 kgs., Rs. 2,17,100.

OXYPHEN BUTAZONE: To Hamburg: Glazers Export P. Ltd., 500 kgs., Rs. 1,85,000.

PESTICIDES: To Piraeus: Ficcom Organics Ltd., 10 MTs., Rs. 2,78,267.

PHOSPHORUS TRICHLORIDE: To L. Adaba: Tramton Investments Co. P. Ltd., 57,600 kgs., Rs. 8,12,634.

PHTHALIC ANHYDRIDE: To Whampoa: Ambuja Petro Chemicals Ltd., 108 MTs., Rs. 9,14,518

POTASSIUM IODIDE: To New York: G. Amphray, Labs., 2,500 kgs., Rs. 5,37,270.

QUINALPHOS 25% BC: To Dubai: All India Medical Corpn., 500 kgs., Rs. 39,974.

RODENTICIDE: To Rotterdam: United Phosphorus Ltd., 4,000 kgs., Rs. 1,58,348.

RED IRON OXIDE: To Singapore: Selective Minchem, 20,000 kgs., Rs. 25,545.

RODOXIDE HMP: To Tomga: Hindustan Mineral Products, 5,000 kgs., Rs. 6,750/-.

SODIUM CYANIDE: To Darwin: Cyanides & Chemicals Co., 18,000 kgs., Rs. 2,94,889.

STABLE BLEACHING POWDER: To P. Louis: Sriram Foods & Ferts., 2 MTs., Rs. 20,076.

SULPHANILIC ACID: To Rotterdam: Western Chemical Co., 2,000 kgs., Rs. 31,127.

1,4-SULPHO PHENYL-3-METHYL-5-PYRAZOLONE: To Genoa: Monarch Dyestuffs Inds., 1,370 kgs., Rs. 95,088; To Liverpool:

Sate Chem P. Ltd., 1,244 kgs., Rs. 1,01,683.

SULPHO PHENYL METHYL PYRAZOLONE PARA TOLUENE SULPHONAMIDE: To Genoa: Western Chemical Co., 5,546 kgs., Rs. 3,59,202.

ZINC OXIDE: To Bahrain: Seven Seas Enterprises, 100 kgs., Rs. 4,250; To Sydney: Metazinc (India) P. Ltd., 20,000 kgs., Rs. 25,545.

DRUG MATERIALS EXPORTED BOMBAY

(From 1.5.38 to 14.5.38)

AMPICILLIN TRIHYDRATE: To Copenhagen: Gujarat Lyka Organics Ltd., 500 kgs., Rs. 4,14,154; To Genoa: Ranbaxy Labs., Ltd., 1,200 kgs., 10,10,484; To Hamburg: Gujarat Lyka Organics Ltd., 2,000 kgs., Rs. 16,04,749; Ranbaxy Labs., Ltd., 500 kgs., Rs. 4,10,550; To Singapore: Armour Chemicals P. Ltd., 1,000 kgs., Rs. 7,95,476.

BRUCINE SULFATE NF: To New York: Chemiloids, 350.8 kgs., Rs. 7,87,433.

BULK DRUGS: To Penang: Sarabhai Intl. Ltd., 25 kgs., Rs. 1,875.

CEPHALEXIN MONOHYDRATE: To Hamburg: Ranbaxy Labs., 500 kgs., Rs. 11,50,721.

CHLORBUTOL BP 80: HEMIHYDRATE: To Port Said: Hemi Chem. Inds., 2,000 kgs., Rs. 1,85,139.

DILOXANIDE FUROATE BP: To Dubai: Euresian, 500 kgs., Rs. 1,75,855.

DIPHENHYDRAMINE HYDROCHLORIDE USP 12: To Hamburg: Unichem Labs., Ltd., 400 kgs., Rs. 70,059.

DIPHENYL HYDANTOIN BASE USP: To Hamburg: Euresian, 200 kgs., Rs. 26,000.

DIPHENYL HYDANTOIN SC DIUM BP/VSP: To Hamburg: Euresian, 100 kgs., Rs. 1,19,595.

DOXYCYCLINE HCL. BP 80 USP: To Rotterdam: Ranbaxy Labs., Ltd., 500 kgs., Rs. 9,12,906.

ERYTHROMYCIN STEARATE: To Toronto: Lawande Pharma, 1,000 kgs., Rs. 7,95,630.

ETHER BP: To Colombo: Bombay Drug House P. Ltd., 68 kgs., Rs. 5,300.

GLYBENCLAMIDE BP: To Colombo: Hoechst (I) Ltd., 49 kgs., Rs. 14,000.

HYDROCORTISONE ACETATE: To Colombo: Nymph Labs., 535.5 kgs., Rs. 34,700.

IBUPROFEN BP 80: To Hamburg: Chandra Pharmaceuticals, 3,000 kgs., Rs. 6,69,000.

IODINE SOLUTION BP: To Colombo: Bombay Drug House P. Ltd., 98 kgs., Rs. 3,000.

MEBENDAZOLE USP: To Hamburg: Ruhr Chemicals, 500 kgs., Rs. 2,09,000; To Colombo: Torrent Labs., P. Ltd., 95 kgs., Rs. 35,500; Pefco Inds., Ltd., 500 kgs., Rs. 2,29,308.

METHYL SALICYLATE BP: To Colombo: Bombay Drug House, 240 kgs., Rs. 17,000.

METRONIDAZOLE: To Mumbai: Unique Pharmaceuticals, 200 kgs., Rs. 50,105.

PARACETAMOL BP: To Colombo: G. Amphray Laboratories, 5,600 kgs., Rs. 3,88,875.

PARACETAMOL: To London: Shrishma Fine Chemicals, 10,000 kgs., Rs. 5,58,898.

PYRAZINAMIDE BP 80: To Hamburg: Armour Chemicals P. Ltd., 1,000 kgs., Rs. 4,95,680.

RIBOFLAVIN SODIUM PHOSPHATE: To Hamburg: Euresian, 100 kgs., Rs. 1,36,828.

RIFAMPICIN USP: To Colombo: Lupin Labs. P. Ltd., 225.74 kgs., Rs. 2,15,000.

SODIUM IODIDE USP: To Hamburg: G. Amphray Labs., Ltd., 1,000 kgs., Rs. 2,34,731. To New York: G. Amphray Labs., 1,000 kgs., Rs. 2,32,542.

SULPHAMETHOXAZOLE : To Hamburg: Metropolitan Inds., 5,000 kgs., Rs. 12,30,000.

SULPHAMETHOXAZOLE BP 80: To Hamburg: Apte Amalooamations Ltd., 8,500 kgs., Rs. 19,26,041; Plant Organics Ltd., 8,500 kgs., Rs. 20,35,443.

SYN. ORGANIC DYESTUFF: To Colombo: Karsandas Mavji, 500 kgs., Rs. 21,976.

TRIMETHOPRIM BP 80: To Hamburg: Bombay Drugs & Pharma P. Ltd., 1,000 kgs., Rs. 4,05,380.

**DYES & DYE INTERMEDIATES
EXPORTED
BOMBAY
(From 1.5.88 to 14.5.88)**

ACID BLUE: To New York: Colour Synth Inds., 500 kgs., Rs. 68,243.

ACID GREEN: To Keelung: Brinda Exports Agencies, 500 kgs., Rs. 1,55,500.

ACID RED: To Keelung: Mangalya Trading Division, 300 kgs., Rs. 93,700; To New York: Colour Synth Inds. Pvt. Ltd., 2,000 kgs., Rs. 1,53,863.

AMARYL BRILL MAGENTA: To Colombo: Amritlal Chemaux Ltd., 100 kgs., Rs. 8,675.

AMARYL BRILL ORANGE: To Colombo: Amritlal Chemaux Ltd., 50 kgs., Rs. 9,783.

AMARYL BRILL ROSE: To Colombo: Amritlal Chemaux Ltd., 125 kgs., Rs. 12,082.

AMARYL BRILL VIOLET: To Colombo: Amritlal Chemaux Ltd., 50 kgs., Rs. 5,922.

AMARYL BRILL YELLOW: To Colombo: Amritlal Chernaux Ltd., 125 kgs., Rs. 12,082.

ANILINE BLACK: To Manchester: Sudarshan Chemical Industries, 460 kgs., Rs. 6,61,881.

ARYLAMIDE ORANGE: To Mombasa: Sudarshan Chemical Inds., 150 kgs., Rs. 1,980.

ARYLAMIDE YELLOW: To Auckland: Sudarshan Chemical Inds., 1,900 kgs., Rs. 53,263; To Copenhagen: Sudarshan Chemical Inds., 2,000 kgs., Rs. 2,59,723; To Mombasa: Sudarshan Chemical Inds., 500 kgs., Rs. 5,950.

ARYLAMIDE YELLOW 168: To Copenhagen: Sudarshan Chemical Industries, 100 kgs., Rs. 14,020.

BLUE FFG EX. CONC: To Chittagong: Colour Chem. Ltd., 1,050 kgs., Rs. 49,244.

BON ACID: To Hamburg: The Atul Products Ltd., 8,125 kgs., Rs. 5,23,072.

BRILLIANT BLUE GEL: To Chittagong: Hico Products Ltd., 1,400 kgs., Rs. 60,562.

BRILLIANT GREEN CRYSTAL: To Rotterdam: Rani Chem Dye, 1000 kgs., Rs. 85,541.

C. ACID: To Rotterdam: Liberty Exports Pvt. Ltd., 3,000 kgs., Rs. 4,65,000.

CHROME PIGMENTS: To Hongkong: Sudarshan Chemical Inds., 1,000 kgs., Rs. 26,374; To Piraeus: Sudarshan Chemical Inds., 3,200 kgs., Rs. 95,175.

COAL TAR DYES: To Antwerp: IDI Ltd., 1000 kgs., Rs. 2,71,773; To Bangkok: IDI Ltd., 13,562 kgs., Rs. 5,32,700; To Colombo: IDI Ltd., 250 kgs., Rs. 73,100; To Rotterdam: Indian Dyestuffs Industries, 2000 kgs., Rs. 6,04,966.

COLOUR CHEM BLACK FR-RK: To Chittagong: Colour Chem Ltd., 600 kgs., Rs. 10,171.

DIRECT BLACK: To Houston: Golden Dyes Corp., Pvt. Ltd., 3,500 kgs., Rs. 2,20,000.

DIRECT BLUE 2: To Liverpool: Karsandas Mavji, 1000 kgs., Rs. 68,492.

DIRECT DYES: To Mombasa: Vintex Engineering Exports P. Ltd., 1,200 kgs., Rs. 1,17,038.

DYE INTERMEDIATES : To Antwerp: The Atul Products Ltd., 3,000 kgs., Rs. 2,18,508; To Bangkok: The Atul Products Ltd., 9,500 kgs., Rs. 8,17,667; Espee Chemicals, 3,650 kgs., Rs. 2,75,847; IDI Ltd., 6,900 kgs., Rs. 5,06,930; Jindal Dye Intermediate, 3,000 kgs., Rs. 1,60,000; Sunbeam Monochem Pvt. Ltd., 6 kgs., Rs. 1,15,300; To Barcelona: Allied Dyes & Chemical Inds., 6,300 kgs., Rs. 5,97,000; To Buenos Aires: Amar Dye Chem Ltd., 2,400 kgs., Rs. 4,65,449; Sandoz India Ltd., 9,955 kgs., Rs. 9,58,967; To Busan: Metro Chem Inds., 6,387 kgs., Rs. 5,70,721; Sunbeam Monochem Pvt. Ltd., 3,559 kgs., Rs. 2,25,845; To Felixstowe: Priya Chemicals, 13,200 kgs., Rs. 5,23,998; To Hamburg: Mangalya Trading & Investments, 650 kgs., Rs. 50,400; Monarch Dyestuffs Inds., 2,500 kgs., Rs. 2,95,874; Vishnu Chem Intermediates Pvt. Ltd., 16,286 kgs., Rs. 10,65,000.

DYE INTERMEDIATE: To Kaoshiung: Priya Electronics & Chemicals, 780 kgs., Rs. 65,743; To Kobe: Jay Chemical Inds., 15,000 kgs., Rs. 8,40,000; To Le Havre: Atul Products Ltd., 7,200 kgs., Rs. 9,72,000.

DYE INTERMEDIATES : To

8,000 kgs., Rs. 7,19,856; Gokul Enterprises, 2,083 kgs., Rs. 2,09,699; IDI Ltd., 1,050 kgs., Rs. 1,84,200, Vivid Exports, 8,621 kgs., Rs. 8,09,982; To Piraeus: Navin Chem Enterprises, 7,000 kgs., Rs. 6,05,400; Vivid Exports, 1,331 kgs., Rs. 1,50,432; To Rotterdam: Indian Dyestuff Inds., 1,150 kgs., Rs. 1,07,591; Indokem Ltd., 700 kgs., Rs. 67,588; To Rotterdam: Jeevan Products, 15,000 kgs., Rs. 4,80,570; Liberty Exports Pvt. Ltd., 21,390 kgs., Rs. 18,64,000; Sadhana Nitro Chem Ltd., 14,000 kgs., Rs. 5,00,280; Sunbeam Monochem Pvt. Ltd., 28,095 kgs., Rs. 13,89,253; Western Chemical Co., 14,579 kgs., Rs. 8,11,599; To Shanghai: Vasant Chemicals, 7,575 kgs., Rs. 5,82,254; To Singapore: Little & Co., 615 kgs., Rs. 53,578; To Yokohama: Sunbeam Monochem Pvt. Ltd., 996.2 kgs., Rs. 1,64,744.

DYES: To Chittagong: Texdyes Corporation, 500 kgs., Rs. 43,906.

FAST BLUE CBR: To Colombo: Colour Chem Ltd., 790 kgs., Rs. 56,315.

FAST RED B BASE: To Hamburg: Monarch Dyestuffs Inds., 2,000 kgs., Rs. 2,36,149; To Rotterdam: Vipul Dye & Chemicals Pvt. Ltd., 2,500 kgs., Rs. 2,31,187.

FAST RED FGR: To Colombo: Colour Chem Ltd., 220 kgs., Rs. 35,615.

FAST RED TR BASE: To Rotterdam: Vipul Dyes & Chemicals Pvt. Ltd., 2,800 kgs., Rs. 3,18,600.

GAMMA ACID: To Barcelona: Jeevan Products, 3,480 kgs., Rs. 3,59,741; To Chicago: Jindal Dyes Intermediate, 3000 kgs.,

Rs. 3,27,500; To Hamburg: Beta Naphthol Pvt. Ltd., 2,700 kgs., Rs. 2,98,624; To Piraeus: Vivid Exports, 1111 kgs., Rs. 1,12,071.

GOLDEN YELLOW: To Chittagong: Colour Chem Ltd., 2,000 kgs., Rs. 96,560.

GOLDEN YELLOW F3R: To Chittagong: Colour Chem Ltd., 216 kgs., Rs. 3,726.

GREEN FB EX. CONC.: To Chittagong: Colour Chem Ltd., 250 kgs., Rs. 17,030.

H. ACID: To Genoa: Monarch Dyestuff Industries, 1,000 kgs., Rs. 1,12,770; To Hamburg: Vishnu Chem Intermediates, 27,052 kgs., Rs. 24,77,367; To Port Said: Alpha Products, 6,680.50 kgs., Rs. 6,43,756.

H-ACID MIN. 78%: Liberty Exports Pvt. Ltd., 2,302 kgs., Rs. 2,53,000.

H. ACID: To Whampoa: The Malwa Vanaspati & Chem Co., 24.5 kgs., Rs. 21,62,516.

K. ACID: To Rotterdam: Jamshri Ranjiasinghji Spg. & Wvg. Mills Ltd., 5,996 kgs., Rs. 3,26,606.

MALACHITE GREEN: To Kobe: Ravi Chem Dye, 3,000 kgs., Rs. 2,14,000; To Rotterdam: Ravi Chem Dye, 5,850 kgs., Rs. 4,40,000.

METANILIC ACID: To Charleston: Sadhana Nitrochem Ltd., 14,000 kgs., Rs. 4,57,612.

METHYLENE BLUE: To Le Havre: Manish International, 4,000 kgs., Rs. 1,20,752.

METHYL VIOLET 2B CONC.: To Rotterdam: Ravi Chem Dye, 1,000 kgs., Rs. 78,545.

NAVINON BLUE: To Charleston: Indian Dyestuff Inds., 1,700 kgs., Rs. 5,12,000.

NAVINON GOLDEN ORANGE: To Charleston: Indian Dyestuff Inds., 750 kgs., Rs. 3,65,850.

NAVINON GREY: To Charleston: Indian Dyestuff Inds., 2,500 kgs., Rs. 8,93,200.

NAVINON GREY BB: To Rotterdam: Mangalya Trading & Investments, 2,000 kgs., Rs. 8,03,500.

NAVINON GREY 88 CDP: To Rotterdam: Mangalya Trading & Investments, 2,000 kgs., Rs. 8,03,500.

NAVINON JADE GREEN: To Rotterdam: Mangalya Trading & Investments, 1,000 kgs., Rs. 2,69,944.

NAVINON YELLOW GCN COP: To Charleston: Indian Dyestuff Industries, 1,000 kgs., Rs. 2,75,600.

OPTICAL WHITENER: To Bangkok: IDI Ltd., 6,000 kgs., Rs. 2,05,900; To Casablanca: Indian Dyestuff Industries, 1,000 kgs., Rs. 35,148.

ORGANIC PIGMENTS: To Bangkok: IDI Ltd., 1,140 kgs., Rs. 90,000; To Casablanca: Indian Dyestuff Inds. Ltd., 950 kgs., Rs. 53,900; Indian Dyestuff Inds., 2,050 kgs., Rs. 1,35,959; Sudarshan Chemical Inds., 1,900 kgs., Rs. 3,71,270; To Leeds: Sudarshan Chemical Industries, 6,040 kgs., Rs. 8,90,536; To Mombasa: Sudarshan Chemical Inds., 350 kgs., Rs. 19,925.

R. SALT: To New York: Vivid Exports, 2,600 kgs., Rs. 83,827.

REACTIVE BLACK 5: To Antwerp: Sharda International, 15,000 kgs., Rs. 14,53,832.

REACTIVE BLACK 5: To Bremen: Rushi Sales, 3,000 kgs., Rs. 2,22,000.

REACTIVE BLACK BBS: To Antwerp: Monarch Dyestuff Inds., 2,500 kgs., Rs. 2,01,179.

REACTIVE BLUE 71: To Rotterdam: Mohita Dyechem Pvt. Ltd., 1,000 kgs., Rs. 1,49,312.

REACTIVE ORANGE: To Chittagong: Vivid Exports, 150 kgs., Rs. 19,472.

REACTIVE RED BROWN 4RM: To Rotterdam: Chemiequip Ltd., 900 kgs., Rs. 1,31,164.

RED FGR EX. CONC.: To Chittagong: Colour Chem Ltd., 1,500 kgs., Rs. 98,234.

RED LAKE C 507: To Copenhagen: Sudarshan Chemical Industries, 4,000 kgs., Rs. 3,38,923.

SOLVENT RED 24: To London: Matoba Industries, 1,000 kgs., Rs. 88,500.

SYNTHETIC COALTAR DYES: To Antwerp: Shree Dye Chem, 3,500 kgs., Rs. 2,98,165; To Bahrain: Jafferbhoy Safehbhoy & Co., 360 kgs., Rs. 14,000; To Bangkok: Jindal Dye Intermediate, 4,500 kgs., Rs. 6,84,000; To Barcelona: Indian Dyestuff Inds., 1,000 kgs., Rs. 3,09,948; To Casablanca: Indian Dyestuff Industries Ltd., 4,325 kgs., Rs. 3,64,452;

To Charleston: Indian Dyestuff Industries, 1,000 kgs., Rs. 6,73,800; To Colombo: Jaysynth Dyechem Pvt. Ltd., 8,275 kgs., Rs. 1,79,600; To Dubai: Castion Colour Chem Industries, 4,000 kgs., Rs. 83,000; To Felixstowe: Indian Dyestuff & Chemicals, 3,000 kgs., Rs. 4,77,064; To Genoa: The Atul Products Ltd., 14,000 kgs., Rs. 10,68,062; To Hamburg: Jay Chemie-Color Inds., 550 kgs., Rs. 1,36,882; Jaysynth Dyechem P. Ltd., 500 kgs., Rs. 98,859; To Hong Kong: Jaysynth P. Ltd., 1,000 kgs., Rs. 1,34,993; To Keelung: Jindal Dye Intermediate Pvt. Ltd., 6,000 kgs., Rs. 2,70,000; To Liverpool: Atic Industries Ltd., 10,602 kgs., Rs. 36,16,406; To Mombasa: Atic Inds. Ltd., 925 kgs., Rs. 3,94,293; To Manila: Sanjay Sales Corp., 2 kgs., Rs. 1,14,555; To Montreal: The Atul Products Ltd., 1,500 kgs., Rs. 1,24,180; To Chittagong: Atic Inds. Ltd., 1,750 kgs., Rs. 6,31,747.

SYNTHETIC COALTAR DYES: To New York: Amar Dye-Chem Ltd., 3,000 kgs., Rs. 3,00,577; Atic Industries, 4,177 kgs., Rs. 19,08,255; To Rotterdam: Magh-

mani Dyes & Intermediates, 2,000 kgs., Rs. 1,60,000; Ravi Chem Dye, 3,600 kgs., Rs. 4,38,836; To Singapore: Jaysynth Dyechem Pvt. Ltd., 9,000 kgs., Rs. 9,50,197; To Tilbury: Mangalya Trading & Investments, 300 kgs., Rs. 1,21,500.

SYNTHETIC ORGANIC DYE-STUFFS: To Antwerp: Kabbur Industries Pvt. Ltd., 2,500 kgs., Rs. 2,68,152; Monarch Dyestuff Industries, 10,000 kgs., Rs. 7,00,196; To Barcelona: Sahyadri Dyestuffs & Chemicals, 975 kgs., Rs. 1,80,865; To Busan: Sunbeam Monochem Ltd., 1,000 kgs., Rs. 1,48,100; To Colombo: Amritlal Chemaux Ltd., 250 kgs., Rs. 20,452; Devarsons Pvt. Ltd., 600 kgs., Rs. 55,000; To Hamburg: Karsandas Mavji, 1,500 kgs., Rs. 1,08,196; To Jakarta: Indokem Ltd., 550 kgs., Rs. 58,634; Little & Co., 3,010 kgs., Rs. 2,22,804; To Kobe: Karsandas Mavji, 1,400 kgs., Rs. 2,79,773; To Melbourne: Priya Chemicals, 500 kgs., Rs. 97,467; To Osaka: Sahyadri Dyestuff & Chemicals, 100 kgs., Rs. 25,500.

GUANIDINE NITRATE

M.E.K.

ACETONE

BENZENE

CYCLOHEXANONE

DIMETHYL FORMAMIDE

EPICHLOROHYDRINE

TOLUENE

XYLENE

PROPYLENE GLYCOL

METHANOL

PHENOL

CAUSTIC SODA FLAKES

SODA ASH

ISO PROPYL ALCOHOL

ACRYLAMIDE

BUTYL ACRYLATE

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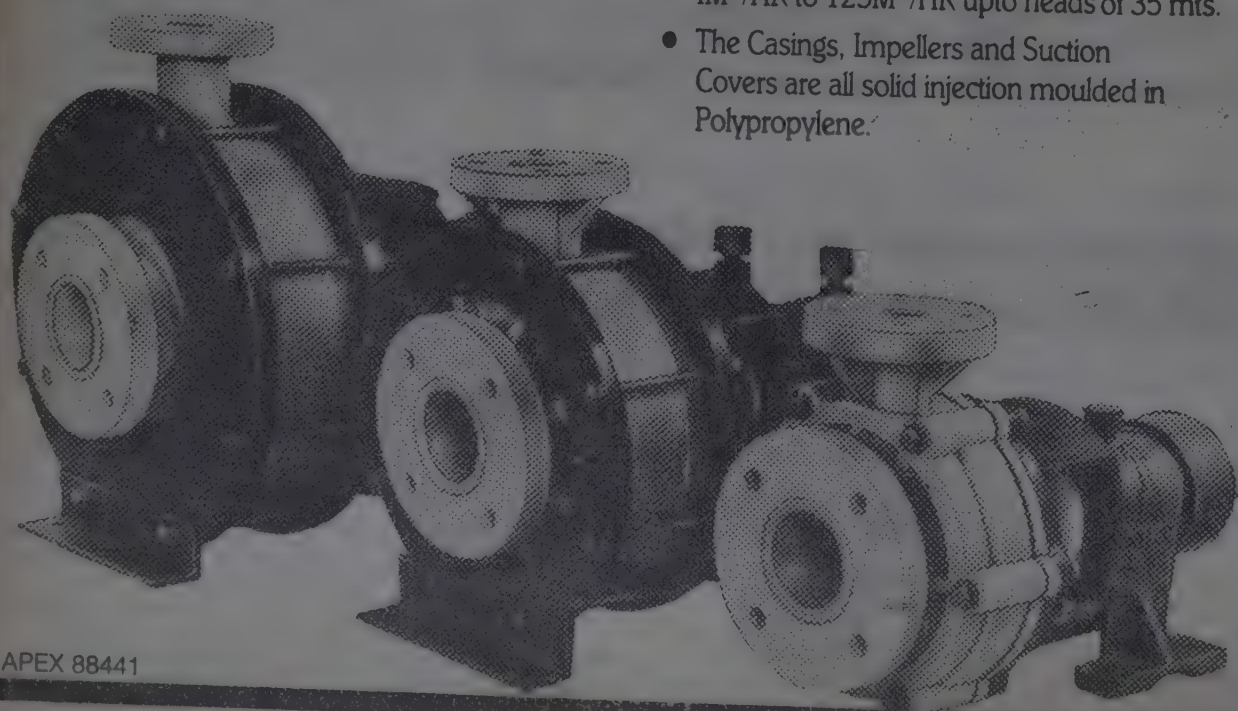
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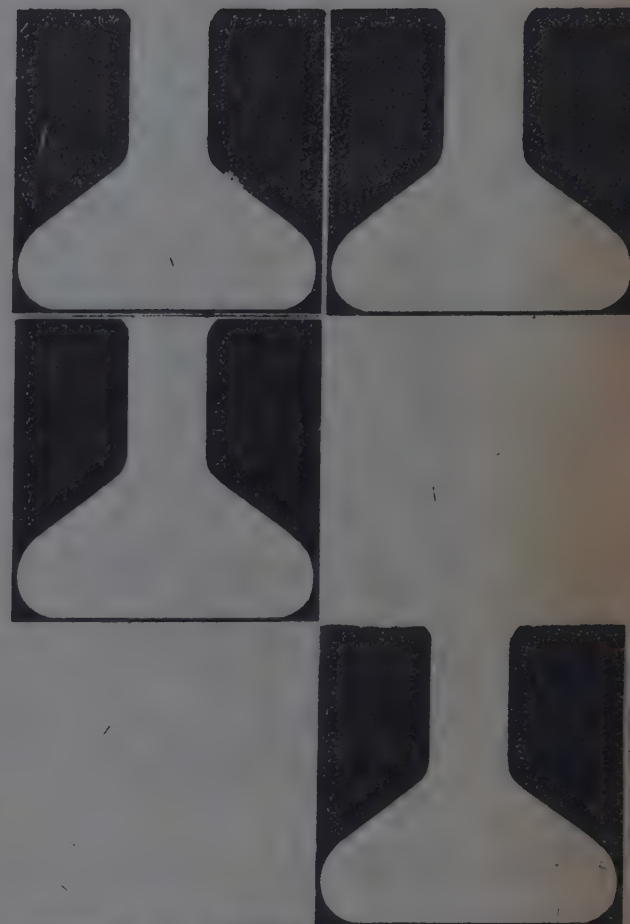
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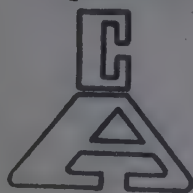
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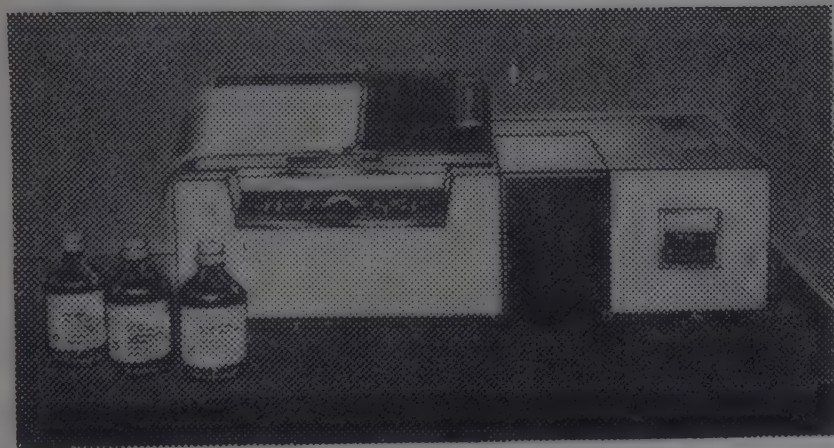
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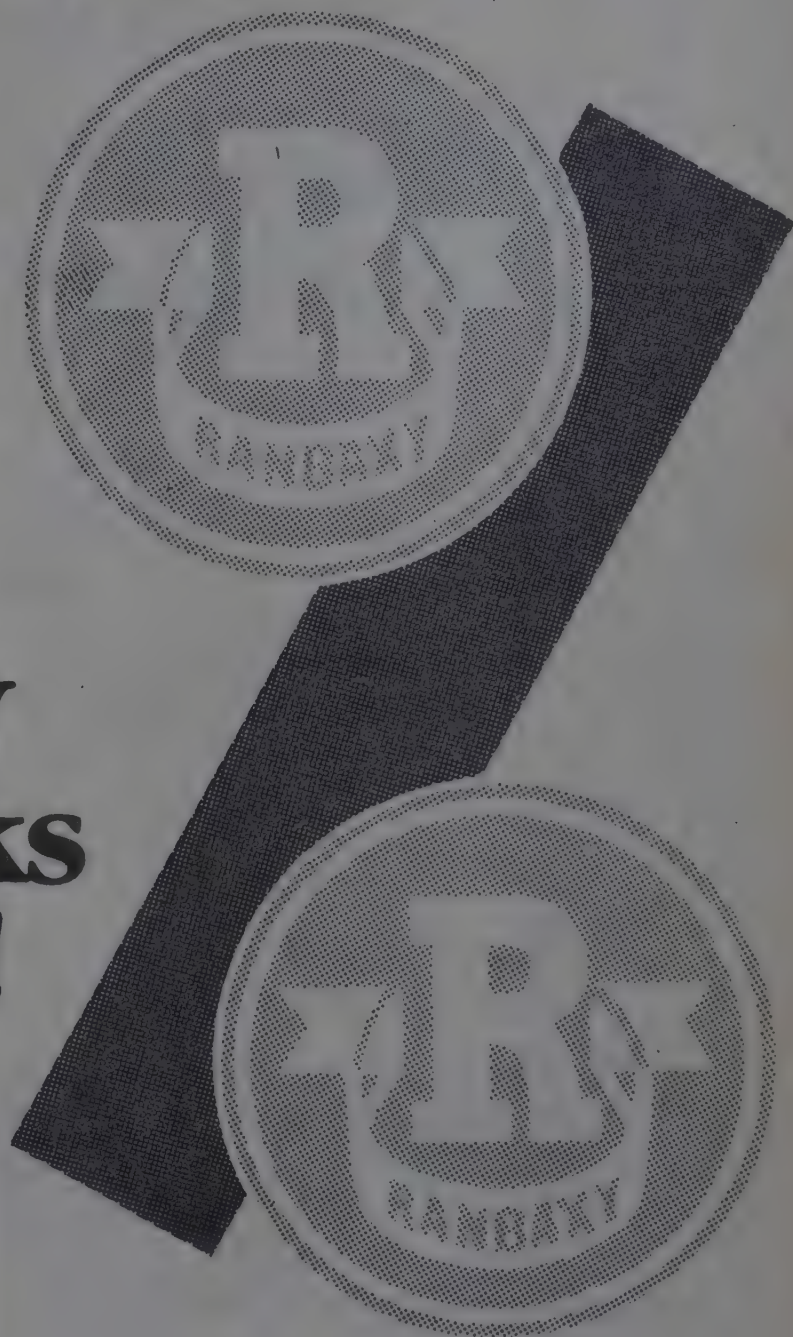
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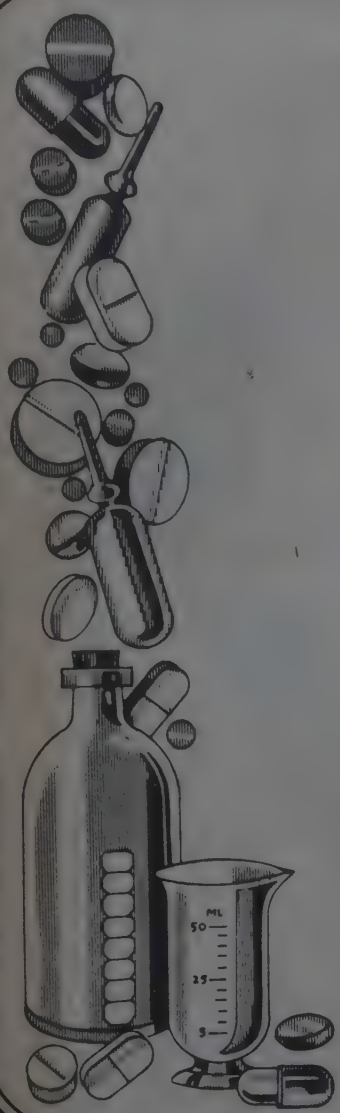


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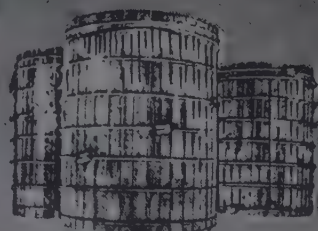
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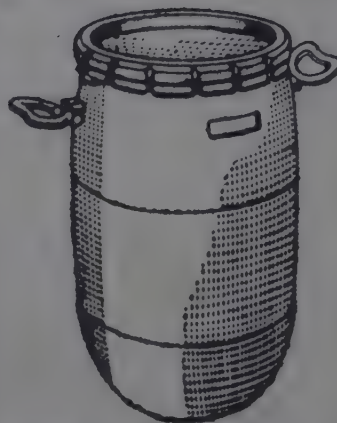
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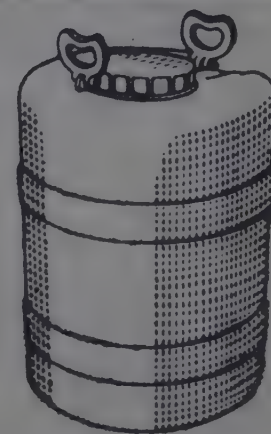
50 Ltrs. Jerry Can



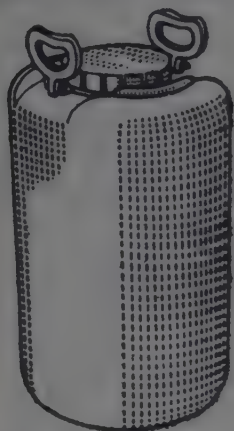
50 Kgs. Round Drum
Full Top Open — 12" Cap



30 Kgs. Round Drum
Full Top Open — 10" Cap



50 Kgs. Round Drum
— 6" Cap



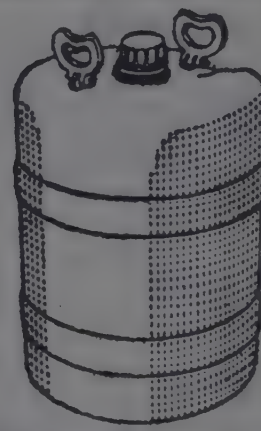
30 Kgs. Round Jar
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20 Kgs. Round Jar
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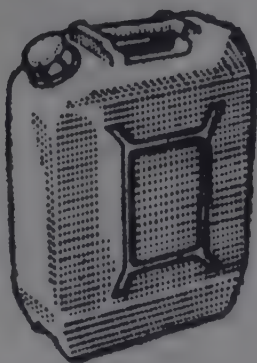
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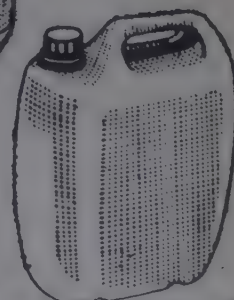
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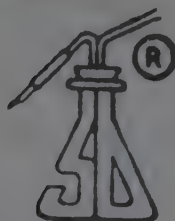
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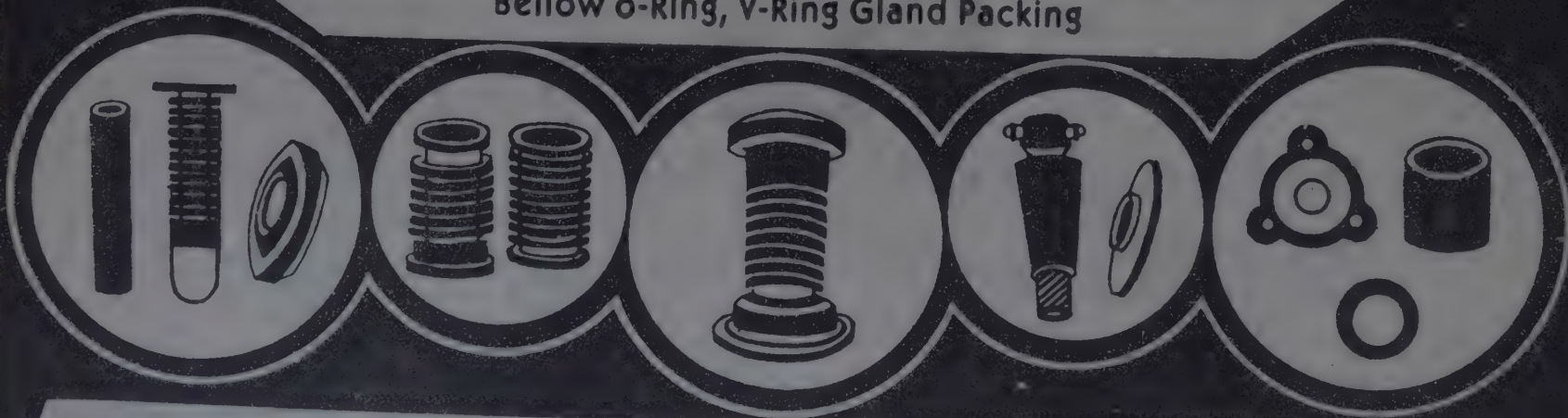
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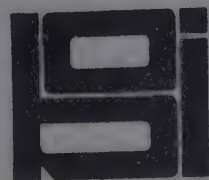
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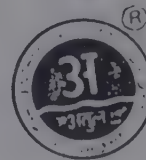
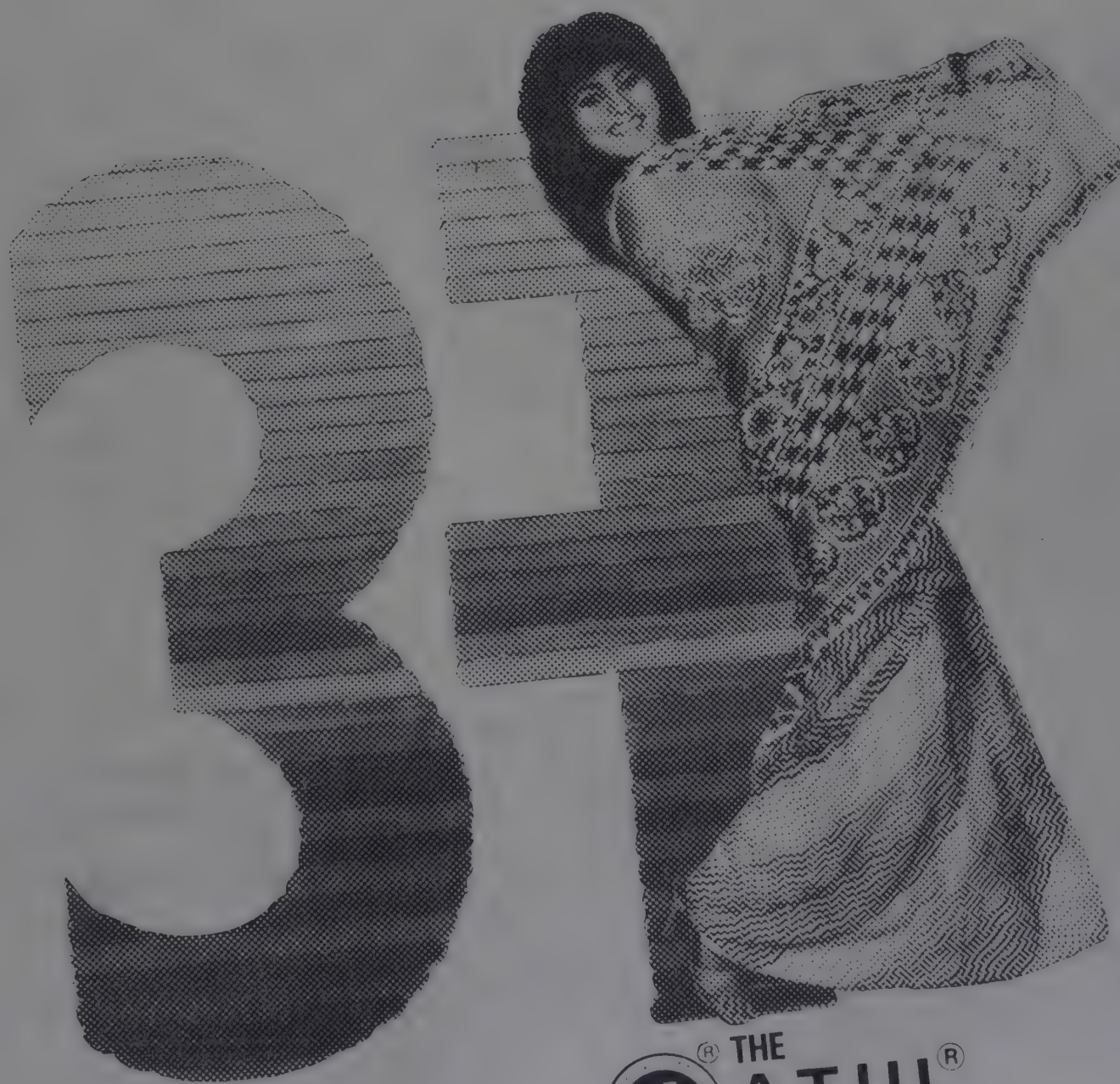
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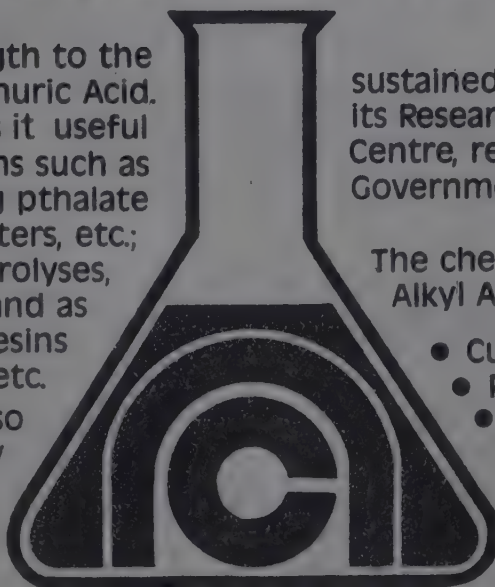
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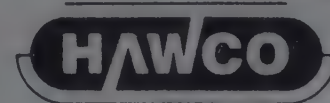
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The Sun at your service

Harnessing of the Sun to meet the energy needs of society has always attracted the attention of ingenious human beings from time immemorial. It is often emphasised by the modern student of energy that the earth receives from the sun radiant energy more than 20,000 times the energy utilised by progressive mankind in all forms. It is estimated that a surface of one square meter of earth's surface receives each day as much as one Kilowatt of this environmentally clean, benign, perennial, source of energy.

A review of the solar energy programme of the Department of New and Renewable Sources of Energy indicates all round progress in the areas of Solar Thermal and Solar Photovoltaics (1987-88). In the field of solar thermal energy nearly fifty research and development projects are currently in progress. Aqua-ammonia solar absorption chillers, are currently under field tests. A 30-tonne solar absorption refrigeration plant operates at Deoria in Uttar Pradesh, and a ten tonne plant in Baroda.

Solar milk chilling plants of capacity 5000 lpd, 400 lpd and 200 lpd are being installed at Bilaspur in Haryana, Wardha in Maharashtra and Bharatpur in Rajasthan. Ten numbers of solar ice pack freezers are also being installed at health centers to study their suitability for preserving life saving drugs. If these are successful, this technology will herald a new chapter by extending the benefits of the white revolution and improved health benefits to isolated rural areas. In the areas of solar thermal power generation a 22 Kwa power plant in Salogpally village in Andhra Pradesh and a 50 Kwa plant at Gwal Pahari are in operation utilising indigenously developed point focus collectors. Solar thermal pumps of capacities 500 watts and 1000 watts, with capacities to draw water from a depth of 40-50 meters have been developed. Nearly 100 solar huts have been provided to army and police officers in the remote hilly areas of the country. Green houses have been constructed in the cold desert areas of Leh for the cultivation of fruits, flowers and vegetables.

A solar Kier of 20 Kg capacity has successfully been developed for processing of cloth in the textile industry. The capacity when scaled upto 100 kg. will find wide application in the handloom sector. Solar thermal energy has been successfully used in the process for extracting alcohol from sugarcane and a pilot plant is in operation in Maharashtra. Solar water heaters using polypropylene collectors and EPDM collectors made out of imported material are now in use in parts of the country to deliver hot water. By 15th January 1988, 1322 commercial and industrial water heat-

ers with a total capacity of 32.15 lakh litres/day and with 66,302 M² collectors area have been installed in the country. Over 1800 domestic solar water heaters with a capacity of 2.12 lakhs lpd and 433 M² collector area have been installed. Solar stills for pumping brackish and saline water have become very popular. Solar water heating systems of 3000 lpd at 90°C using tubular collectors has been installed in Madras for cooling application. The largest solar water heating system of capacity 1,20,000 lpd has been installed and commissioned in Panchgana in Madhya Pradesh. One 2.4 lakh lpd unit is under installation, at Ujjain.

The Solar Energy Center has earlier designed and installed a 30 tonne solar cold storage plant at Gorakhpur. Solar passive architecture provides a means to design energy efficient buildings. The Department has already taken initiative in developing passive buildings under various climatic conditions and their performance evaluation. This actually has tremendous potential in our country in saving energy in heating and cooling the buildings and improving comfort conditions.

Solar photovoltaic technology enables the generation of electricity directly from sunlight and is an important technique of solar energy utilisation. Over a decade of experience has been generated in India in R & D activities relating to photovoltaic technology. The main objectives have been the development of low cost solar cells improvement in efficiency, life, rehabilitation of modules and the development of systems from various application. Bharat Heavy Electricals Ltd. have been given the responsibilities for installing and commissioning amorphous silicon plant facilities for further technology development with inputs from R & D groups and also for pilot production.

The main elements of the Photovoltaic Demonstration Programme of the Department of Nonconventional Energy are the initial electrification of villages through provisions of street lamps, community lighting and TV systems, supply of water pumping systems to individual users and institutions, installation of small power plants in rural areas and use of photovoltaic systems in Railways, Border Security Forces etc. Nearly ten thousand street lighting systems have been supplied benefitting 2000 villages in Andhra Pradesh, Himachal Pradesh, Uttar Pradesh, Rajasthan, Gujarat, Maharashtra, Orissa and Nagaland. 44 rural community TV sets with photovoltaic power pack, a few of them equipped with dish antenna to receive signals directly from satellites have been installed upto December 1987 including two for use at Lakshadweep island.

Solar photovoltaic water pumping systems, a manual tracking structure and a matching DC pump set, which can be used for drinking water supply and for irrigating small farms have been put up under a modest demonstration programme in 126 stations. About 100 tribal homes in Gujarat and Meghalaya have been provided with "Stand Alone" PV systems for lighting homes. Centralised P.V. power systems in the range of 1-5 KW for meeting rural electricity needs are commissioning in Goa, Mizoram, Tripura, Lakshadweep.

Solar modules for charging vehicle batteries and communication equipment in police stations, border outposts have been supplied to the Indo-Tibetan Border Police, Border Security Police etc. Two solar photovoltaic modules have been installed in the Maitri Camp in Antarctica for charging a bank of batteries. Monitoring of the two modules left behind at Dakshin Gangotri revealed that they were still intact registering satisfactory performance. Under a joint programme with Railway Board, PV power systems are installed on railway stations far away from the nearest electrical sub-station for operating traffic, mechanical or symaplore signals. These hybrid systems depend on solar PV backed up by wind energy mill to face the vagaries of the weather. One such system has just been installed in the Palghat -- Bangalore Division of the Southern Railways.

In order to demonstate the use of photovoltaic energy sources for the treatment of brackish water, an experimental solar based reverse osmosis and electro dialyser unit has been put up in Delhi. Latest solar energy news from U.K. reports that the Space and Communications Division of British Aerospace has been awarded a contract worth £9.5 million by the European Space Agency (ESA) to provide the second pair of solar arrays for the NASA/ESA Hubble Space Telescope and to modify the present solar arrays to include atomic oxygen-resistant high-powered blankets. The two "wing-like" solar arrays, each comprising two flexible blankets of solar cells and deployment and orientation mechanisms, will convert solar energy into electricity to power the telescope's scientific instruments and communications payload. Work on this latest contract will be undertaken at the Division's Bristol site, which was responsible for the design, manufacture and test of the first pair of arrays for the Hubble Space Telescope, scheduled for launch by the space shuttle "Discovery" in June 1989.

The new and enhanced solar arrays, designed as replacements to the first, will be transported when needed to the earth-orbiting telescope by a servicing shuttle. Astronauts will then remove the old and fit the new arrays which have a design life of five years and can provide up to 5.5 kW of electric power. Operating above the atmosphere of the earth, so avoiding distortion, the Hubble Space Telescope will give astronomers a clearer view of the Universe. The telescope's sensitivity will enable it to view objects at an estimated distance of 14 billion light years.

The solar energy center at Gwal Pahari in Gurgaon district has successfully completed the first phase of collaborational project with Brookhaven National Laboratory, USA. During the first phase, highly efficient plastic collectors developed at BNL were tested at the center for their performance under Indian environmental conditions. The second phase of the project involving the transfer of technology for the manufacture of these collectors would be transferred to the Solar Energy Center.

One tantalising use of solar energy not so well known is the solar furnaces. Solar furnaces give a very high concentration of focussed solar radiation. The solar furnaces with high optical precision give temperatures over 3000°C. The solar furnace is an excellent means of studying the properties of ceramic materials at high temperature above the range ordinarily measured in the laboratory with flames and electric current. The prospects of useful metallurgical and chemical operations being carried out at high temperatures in Solar Furnaces are regarded as bright. The earliest solar furnace was designed by Leonardo De Vinci to set fire to the sails of enemy ship.

In 1912, a Solar furnace consisting of 19 lenses, each of 60 cm diameter attained a temperature of 3100°C at the California Institute of Technology, USA. In 1940, General Motors of USA developed the first industrial model solar furnace. Small furnaces were made using search light mirrors for experiments on high temperature properties of materials for jet engine rockets etc. by Trombe of France in 1947, by Cohn of USA in 1954 and by Cohn and Heisester of USA in 1957. In 1970, Trombe has succeeded in constructing a huge solar furnace for industrial trials. It consisted of a paraboloidal concentrator of size 54 m x 40 m made of 9500 numbers of black silvered glass mirrors, 63 heliostats directed the sun's rays to a concentrator which could produce 3200°C temperature in an area of 60 cm diameter. The largest solar furnace ever built has been commissioned in August 1982 at Mojaive desert, California, USA. It consists of a large number of heliostats in an area of 78 acres and the receiver is placed atop a steel tower of 92 meters high.

The credit for designing and building the first solar furnace in India goes to Prof. S. Seshan of the Indian Institute of Science, Bangalore who has designed and fabricated a prototype 4 meter diameter solar furnace in 1983. The furnace consists of a radar antenna paraboloidal concentrator which was assembled by the Electronics Corporation of India (ECIL), Hyderabad. It is made of aluminium sheet with back up aluminium sections and has an aperture diameter of 3.65m and a focal length of 1.2m. In order to get mirror like finish aluminised polyester film popularly known as mylar was pasted on the dish surface. The absorption of the mylar sheet is very low but its reflection satisfactorily high.

Earlier an attempt was made to galvanise bolts and nuts in a bath of zinc melted by solar furnace and the galvanising was effected without difficulty. For the latest 4 m diameter solar furnace, the calculated theoretically attainable temperature is 4577°C. But in actual practice due to various shortcomings, the temperature attained was around 1190°C only. Experiments have proved the viability of employing solar furnaces for heat treatment of steels and alloys. It should soon be possible to design solar furnaces for metal melting/processing operations around 1000°C.

Cost benefit analysis for the melting operations indicate that solar furnaces have a distinct advantage over other commercial furnaces for specific metallurgical operations and these have tremendous potential in tropical, urban and rural areas of India for small scale metallurgical industry. Solar energy is a perennial all pervasive abundant but diffuse source of energy and its utilisation is neither easy nor cost effective in most cases.

- T.P.S. RAJAN

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Global Pharmaceuticals Industry

A recent study of the world pharmaceutical industry estimates the turnover as \$100 billion but shows marked shifts in recent years away from the dominance of US up to the early seventies. The index as per R & D expenditure and new products has also shifted to West Germany and Japan. While in 1964, US was the biggest spender it had been overtaken by West Europe in 1973. The total R & D expenditure rose from \$500 million to \$7200 million during the period and is expected to touch \$10 billion now. In 1983 Japan had the highest R & D budget at \$964 million with West Germany not far behind at \$916 million. The US has been most innovative but their share of all new drugs decreased while West Germany advanced from 13% to 16% and Japan from 10% to 22%.

The number of important drugs (with a turnover of above \$20 million) and leading drugs (with turnover of over \$100 million) have also declined. US, British and Japanese have maintained a supremacy due to the major share of antibiotics in these years but the newer synthetic and biotechnology products may tilt the balance towards US once again. The source of new drugs in the recent years country-wise is given in the table alongside.

While the pharmaceutical industry is a global enterprise with domination by multinationals the emergence and importance of new drugs is greatly helped by the country where it is first introduced. The US regulations are more strict even after the relaxations for Investigational New Drugs. The importance of dominance of a new drug is invariably helped by "secondary" marketing arrangements through licencees, distributors or joint ventures in other countries of importance. New entrants into pharmaceuticals have little hopes of success unless through acquisitions. There is a movement towards fewer giants through the shedding of pharmaceuticals

Nationality of parent company	Number of new chemical entitles 1981-85	% of Total	
		81-85 %	61-77 %
US	69	25	24
Japan	61	22	10
West Germany	45	16	13
Switzerland	23	8	8
Italy	20	7	7
France	19	7	20
UK	12	4	5
Scandinavia	7	2	3
Others	24	9	10
Total	280	100	100

by those for whom it is presently a minor section and who cannot readily move up the ladder.

The third world countries present a rather uncertain picture. For most multinationals the market and profits from any individual third world country is too insignificant a share. Overall the third world uses only 15% of the global market and of this 70% is the share of multinationals. Some feel that many of these countries are "dispensable" and not worth all the risks and uncertainties. Many of them are prepared to accept price controls, high taxation, discriminations etc. but are more worried on the problems of patent violations or compulsory licensing. There is marked reluctance to produce intermediates of basic drugs.

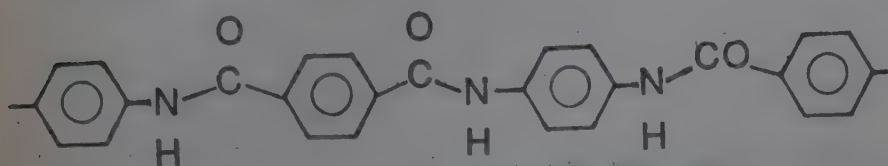
India is still a minor entity in pharmaceuticals and all its exports have little importance in a world context. But there is slow progress towards a receding timeframe of targets for health care for all and hardly any serious efforts towards mobilising the non-allopathic systems of medicines for a greater role.

Aramid Fibres Market set to advance

Du Pont's aramid fibres -- *Kevlar* -- had been locked up in a patent dispute with Akzo of Nederland for some years and this has held up market development to some extent due to consumer uncertainties. *Kevlar* was barred from Netherlands while Akzo's *Twaron* was barred from USA and supply uncertainties prevented developments except in special space and defence related areas for

Kevlar. Now this patent dispute has been settled out of court with arrangements for cross-licensing and access to markets except for Akzo which can market its fibre only after expiry of Du Pont patent rights in 1990. The patent dispute was on the use of solvent used in the process for polymerisation -- a chloro N-methyl pyrrolidone -- and on process patent for spinning. The fibres is based

on p-phenylene diamine terephthalate as per the formula given below:



The fibre has strength equivalent to steel, thermal stability in excess of 250° and resistance to chemical degradation. The development upto commercial process and applications has reportedly cost over \$700 million to each and prices are naturally high for wider areas of usage. The use for reinforcement of rubber for tyres could not develop due to the price factor. The main area of use is for space vehicles and other Government supported aerospace and military ventures. The capacity of Du Pont is 60 million pounds against an off-take of less than 50% and a total global demand of 38 million pounds. Akzo has a capacity of 5000 tonnes. Para aramid fibres for composites along with carbon fibre in polymer matrix is said to reduce weight of aircraft and the potential for such development is very great. It also has radar transparency so that the new aircraft "stealth" is likely to be a sizeable outlet. Besides use for other aircraft, para aramid fibres are good reinforcement for armor protection in personnel carriers and other military

vehicles. *Kevlar* is used for bullet-proof dresses. It is also said to be useful for reinforcing aluminium and in combination with ceramic foams and possibly in primary structural material. The rising price of fuel will increase the trend towards lighter vehicles and aircraft. Another major area is as a replacement of asbestos fibre in areas such as brake linings where asbestos is being banned. Though cost is \$8 to 10 per pound of *Kevlar* pulp as against 10 cents for asbestos the requirement is so low as to be cost effective. Joint efforts of Du Pont and Akzo with reduced costs as a consequence of larger markets may raise the demand to over 32,000 tonnes by early 1990s. Du Pont is taking up production in Japan in a joint venture.

There are other speciality fibres such as *Techmora* of Teijin which is made by a different process using the acid chloride and the para phenylene diamine and diamino diphenyl ether to keep out of patent disputes. DSM of Nederland has a polyethylene fibre named *Dyneema* SK Leo made jointly with Toyoko of Japan but these are not serious threats to *Kevlar* and *Twaron*. There is also the aramid derived from meta phenylene diamine instead of the para and termed *Nomex*, also of Du Pont. Mixtures of *Kevlar* and *Nomex* are said to have better high temperature resistance.

Acetic acid scenario

The acetic acid production suffered a severe shock in USA when the explosion of Hoechst-Celanese plant in Pampa, Texas removed nearly 500 mil. lbs. of supply -- a fifth. There was however an equally serious disaster at the Shell Chemical cracker dislocating ethylene supplies by over 6% and the product most affected was vinyl acetate monomer (VAM), the largest user of acetic acid. the fall in VAM production due to ethylene shortage helped to tide over the supply-demand dislocation for acetic acid. The ethylene plant may be on stream soon but the acetic acid plant rebuilding will take a year more. The US is able to import acetic acid to bridge the gap -- 200 mil. lbs. from Mexico and W. Germany from Hoechst plants in these countries. But exports of VAM is severely curtailed -- exports amounted to nearly 100 mil. pounds of acetic acid in the form of VAM. VAM accounted for the use of 500 mil. lbs. of acetic acid and 20% were being exported.

The Pampa, Texas plant was based on butane oxidation and the supply of by-products -- formic acid, propionic acid, acetate esters, butyric acid -- have also suffered. Union Carbide shut down its butane oxidation plant a few years back and is a large purchaser of acetic acid for VAM. Du Pont is another large buyer of acetic acid by VAM while Amoco purchases large quantities for its PTA plant -- 17% of acetic acid now reportedly go for PTA including Eastmans. There is a lot of byproduct acetic acid available for recycle or sale -- from polyvinyl alcohol from cellulose acetate and other acet-

acetic acid etc. So there is a lot of flexibility in acetic acid marketing and use. Acetic acid used in PTA process for solubilising cobalt manganese bromide catalyst ends up as carbon dioxide and hence the fairly large use of about 10% on PTA production. Eastman is said to be producing 150 million pounds of acetic acid in its proprietary process for PTA where acetaldehyde is used via peroxide and ends up as the acid. But Eastman has a large production of cellulose acetate and most of coproduct acetic acid is recycled to make only oxide. They also have the large production of acetyl anhydride by carbonylation of methyl acetate. Eastman also continues to make acetic acid from acetaldehyde oxidation to meet the demands.

Today half of US production of acetic acid is based on methanol by Monsanto process and probably 20% by the earlier high pressure carbonylation process at Borden Chemicals. The butane based plant of Hoechst Celanese is to be restarted on same feedstock and interest in butane has risen due to expected free availability at low prices as a consequence of cuts being imposed on butanes in gasoline. The price of methanol has also gone up from 26 cents in 1987 to over 60 cents a gallon now. Hence it is not a rosy picture for methanol-based acetic acid in USA in new plants. Ethylene based production via acetaldehyde may continue to a limited extent. The production from ethyl alcohol in simple small plants as in India will continue to be attractive unless the excise levies upset the economics due

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PETROCHEMICAL PROJECTS :

India exploring joint ventures in Gulf

India is working on the possibility of setting up petrochemical projects in West Asia. This follows identification of areas for joint ventures by India and countries like Saudi Arabia, Bahrain, Qatar and Abu Dhabi.

The development comes in the wake of the visit by a high level study team under Mr J.J. Mehta, to West Asia. The team had gone at the instance of the department of chemicals and petrochemicals to study the feasibility of setting up joint ventures in petrochemicals in these countries. Mr Mehta was former chairman of Indian Petrochemicals Ltd (IPCL), public sector undertaking.

To begin with, Sabic of Saudi Arabia plans to increase its ethylene capacity by 500,000 lakh tonnes per annum. It wants to set up a joint venture with India for producing 2,50,000 tpa LDPE with long term buying commitments.

It has also shown interest in a joint venture project in India to meet the local requirements. Saudi Arabia appears to be keen to collaborate in the production of styrene by importing benzene from India for a 1,00,000 tpa plant. Of this, half could be sold in the international market.

The J.J. Mehta team comprised Mr C.D. Anand, industrial adviser, DGTD, Mrs Lalitha B. Singh, deputy adviser, petrochemicals, Mr. M.V. Naik, gen. manager IPCL (engineering), Mr K.N. Naik, joint financial controller, IPCL, and Mr G.D. Goyal, deputy manager, Engineers India Ltd (EIL).

The study team was set up earlier to see whether the views regarding the available possibilities for co-operation in the Gulf countries were correct. Therefore, the department of chemical and petrochemicals decided to ask the study team to visit these countries for an on the spot assessment.

According to information available a preliminary proposal from Bahrain was also examined which related to the use of gas in producing 200,000 tpa ethylene or 200,000 tpa LDPE with 100 per cent import by India. Discussions with Qatar and Abu Dhabi centred around diversifying their activities in petrochemicals. In Qatar, the

study team identified an availability of 1.40 lakh tpa of ethylene. Proposals for co-operation with Qatar in the petrochemicals area would now be taken up on a government to government basis or any other mutually identified channel.

In the case of Saudi Arabia, Sabic wants to do value addition of its products in its own country and is interested in a joint venture for producing 2,50,000 tpa of LDPE with long term buying commitments by India. Sabic has also shown keen interest in having joint ventures in India for meeting requirements of the Indian market. It has sought information about investments in India for its joint venture collaboration.

Likewise, Sabic has evinced interest in setting up a styrene project in Saudi Arabia. The finance for the joint project would be made available in Saudi Arabia on subsidised rates.

Price hikes hit LDPE market

The average monthly consumption of low density polyethylene has dropped from 14,000 tonnes to 9,000 tonnes as a result of frequent price increases by Indian Petrochemicals Corporation (IPCL), the only producer of the material and the canalising agent for imports.

This 36 per cent fall was recorded before the latest price hike of Rs. 3 per kg. effected by IPCL on October 5. This is proven by the statistics compiled by IPCL itself from its Bombay and Bangalore branches, according to Mr. Anil Goradia, President of All-India Plastics Manufacturers Association (AIPMA).

At this rate, another 20 per cent fall is likely by Diwali, Mr. Goradia feared. The plastic industry, which was growing at the rate of 12 per cent till 1986-87 has now reported negative growth and unless the trend is reversed, it will result in the closure of units, he feared.

What is ironical is that when industrialists of every hue are hastening to enter the petrochemical sector to create a larger indigenous base for polymers, end uses of plastics, carefully nurtured over the years, are being cut off, he lamented.

The J.J. Mehta Group is reported to have been told that 3:1 debt equity ratio with 51:49 equity participation is allowed in Saudi Arabia. The project could be set up in the Al Jubail industrial town for petrochemical complex.

As regards Bahrain, EIL has submitted a proposal for development of the petrochemical industry in the country using natural gas fractions.

The Qatar government on its part wants a formal proposal from India for setting up a joint venture. It has sought information like the extent of participation by India, marketing aspects, long term agreement for petrochemicals purchase by India, expertise available and the financing plan based on Indian assessment.

Abu Dhabi is interested in diversifying its activities in the petrochemical field and it expects a formal letter from India outlining the details about the joint ventures that might be proposed. The officials from that country are keen to visit Indian petrochemical complexes to get first hand information.

According to the IPCL study quoted by AIPMA, out of 800 plus units served from Bangalore, some 400 units have not been lifting supplies of LDPE. More than 500 out of the 1200 units served from Bombay have not lifted any supplies — not even a kg — for the last six months, revealing that they are already on the sick list, AIPMA officials said.

Some have accused IPCL of having misguided the Government by persuading that availability was more important than price and that the processing industry could bear higher price. Pooling price of LDPE sold by IPCL has jumped from Rs. 27,000 in November 1987 to Rs. 33,100 in October 1988. There has been a similar increase in the price of polypropylene, PVC resin, HDPE and polystyrene.

It is said that IPCL can sell its LDPE at Rs. 26 per kg. but thanks to pooling the consumers have to pay Rs. 35. It is an unusual case of Indian goods being cheaper than imports. Direct imports would cost as much as Rs. 40 a kg.



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Drug dealers seek 10% minimum margin

The Pharmaceutical Distributors Association (PDA) has expressed its apprehension over the way the Drug Price Control Order of 1987 is silent over the traders' margin, implicitly hinting that it is a matter to be settled between the manufacturers and traders.

This attitude of the Government has created a lot of confusion among the traders and manufacturers, said Mr. R. Srinivasan, General Secretary of the Association, while addressing a meeting of its members in Madras on October 16.

Mr. Srinivasan said it is necessary to guarantee a minimum commission of 10 per cent for stockists, on a uniform basis, without the excise duty content thrown in. But, on this issue, PDA is not interested in a confrontation with the manufacturers, he added.

He also urged the manufacturers not to cut the prevalent margins prior to DPCO on any pretext, and said that his organisation is for mutual discussion to arrive at an agreed solution on issues arising out of price and margin revision.

PDA has submitted a detailed representation to the Taxation Rationalisation Commission giving a comprehensive list of life saving drugs and seeking total exemption of tax on them in Tamil Nadu as has been done in Maharashtra and Karnataka. It has also pleaded for a uniform rate of six per cent sales tax on all drugs to avoid confusion.

Mr. Motichand Golecha, President of PDA, presided over the function.

Though the meeting was slated to be addressed by the chiefs of IDMA,

OPPI, PAMDAL and AIOCD, none of them turned up. According to Mr. Srinivasan, this is due to a meeting being held in Bombay over the contentious issue of traders' margin.

PANEL TO REVIEW DRUGS UNDER CATEGORY I

The Union health ministry has appointed a seven member expert committee headed by Dr. H. H. Siddiqui, professor of pharmacology, All India Institute of Medical Sciences, New Delhi to review the list of drugs in the category I of Drug Price Control Order (DPCO), 1987. It is learnt.

Dr. Prem Gupta, drug controller of India, and five other leading medical experts are also in the new committee. The committee has been given one month's time to finalise its recommendations. The decision to appoint yet another committee to review the categorisation of drugs is a sequel to the opinion of medical professionals that some more drugs to be included as essential ones in category I.

Some of these suggested drugs are vitamin A, an important vitamin, folic acid used for the treatment of anaemic conditions and certain antibiotics used for the treatment of sexually transmitted diseases (STD). Most of these drugs are currently in category II of the DPCO.

Both Indian Drug Manufacturers' Association and Organisation of Pharmaceutical Products of India had already represented to the government against any further addition into the list of category I drugs.

The associations have taken a stand that the government has already included all drugs required under the national health programme in the category I.

VANTECH PESTICIDES TO MAKE MONOCROTOPHOS

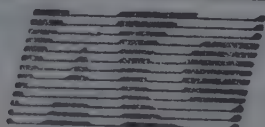
Vantech Pesticides, a joint venture project, by Dr. K. R. Das, and Mr. Koteswara Rao, along with APIDC, setting up a pesticides complex at Khairatabad in Medak district, a notified backward area in Hyderabad. This integrated pesticides complex will manufacture annually 200 tonnes of monocrotophos (MCP) technical, 100 tonnes of chlorpyrifos (CPP) technical and 40 tonnes of butachlor (BTC) technical. Of this, 50 per cent of the technical materials will be formulated into the respective formulations and the balance 50 per cent will be sold to non-associated formulators in the country. The project is based on technologies developed at the Regional Research Laboratory, Hyderabad.

According to Dr. K. R. Das, effective cost control measures have facilitated creation of additional assets in almost every area within the originally estimated project cost. The product mix is ideal, with rising demand growing the rate. Moreover, the products have a ready market within the state. Besides being import substitution items, the products also have export potential particularly to South East Asian countries, USSR and Africa. The integrated plant concept would facilitate making alternate products within the same plant. The expected annual turnover is Rs. 12 crores.

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Few buyers for Bihar industrial alcohol

There are virtually no takers for the industrial alcohol produced by distilleries in Bihar, owing to high export pass fee levied by the state government, creating a deep crisis for them.

According to industry sources, if immediate remedial measures were not taken, more than 50 per cent of the distilleries would be closed.

For some unexplained reasons, the Bihar government charges export pass fee at the rate of Rs. 5.25 per litre while Maharashtra and Uttar Pradesh, which are its main competitors, levy it at Rs. 1.25 per litre. As a result, Bihar alcohol has become costlier. It is not attracting many buyers.

The centre had marked 60 lakh litres of alcohol for export from Bihar. However, only about 3.92 lakh litres could be lifted from the state till last month on account of higher export pass fee.

This has created a number of problems, besides financial, for distilleries and sugar units. The situation is the worst in case of six out of 10 distilleries as there is no offtake from these units.

In the event of their closure, production of alcohol in the state which averages 3.2 crore litres per annum will register a sharp fall depriving the state of a considerable amount of excise revenue.

The sugar units too will be hit, for molasses, a by-product from these units, is used as a raw material by the distilleries. In case of closure of these six distilleries, the lifting of molasses from sugar mills will come to a virtual halt and working of the mills will be seriously affected.

Molasses of the order of 1.5 lakh tonnes was produced in Bihar in the last alcohol year (December-November). In addition, there was a carry forward stock of 10,000 tonnes. Thus, the total availability of molasses in the state was to the tune of 1.6 lakh tonnes during the previous year.

Production of molasses improved throughout the country during the last sugar season. As Maharashtra and Uttar Pradesh had anticipated rise in production, they brought down the export pass fee from Rs. 8.25 per litre to Rs. 1.25 per litre. As such distilleries in these two states did not face problems this year. This was not the case with distilleries in Bihar, for

in this state, the rate was maintained at Rs. 5.25 per litre.

Bihar can easily export 1.2 crore litres of alcohol per year, the industry sources assert, if it fixes a competitive rate for export of alcohol to other states. The revenue earning which is low, at present, can also go up considerably.

UP ALCOHOL FOR FRANCE

The Centre has approved the export of 30 million litres of industrial alcohol (rectified spirit) to France.

The specified quantity is to be lifted from amongst 28 distilleries in Uttar Pradesh, according to information available.

This solves a long-standing problem of excess storage of ethyl alcohol by UP distilleries. Ethyl alcohol is a derivative from molasses and UP being one of the major sugarcane producing States has been facing a severe storage crisis because of poor offtake resulting from the imposition of restrictions on inter-State movement of alcohol.

According to available information, the specified quantity will be procured by Societe Financiere, d'Entreposage et

de Commerce International de l'Alcohol (Sofecia) of France. Kesar Enterprises Ltd., a Bombay-based export house will procure the alcohol from UP distilleries on behalf of the French company, it is understood.

Meanwhile, an agreement has been finalised between Kesar Enterprises and the All-India Distilleries Association (AIDA) on the terms and conditions of procurement. Accordingly, AIDA will act as a nodal agency for identifying individual distilleries and in allocating quantities to be supplied by each of them. AIDA will also assist the exporting firm in finalising agreements with individual distilleries for the purchase of specified quantities of methyl alcohol.

France has agreed to purchase an unspecified quantity of minimum 94.75 per cent strength volume at 15.6c of methyl alcohol conforming to Indian standard specification No. IS:32:1959 grade 2. The 30 million litre alcohol export from UP will form a part of this export arrangement.

The export firm, on its part has agreed to pay Rs. 2,896 (ex-distillery) per tonne for the alcohol procured. The freight charge of carriage of alcohol from the distillery to Kandla port will also be borne by the company.

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Filipps to dyestuffs industry likely

The Government is considering an incentive package to help the dyestuff industry to renovate its old plants to meet the growing challenges offered by the export market. The concessions will be decided on a case-to-case basis and will be tied to export objectives, it is learnt.

The industry has already submitted its proposals to the Government in this regard. Installation of new equipment will not only make the industry more competitive, but help minimise pollution and other hazards, it is held. The industry has pleaded for duty-free import of selected items in this regard.

Exports of finished dyes alone touched a record 5,000 tonnes last year. According to industry calculations, this can be increased to 8,000 to 9,000 tonnes by the end of the century. The industry has the potential to boost exports to Rs. 500 crores in less than two years, according to prominent exporters. Exports amounted to Rs. 215 crores last year. The growth has been phenomenal, considering the fact that exports contributed to only Rs. 45 crores in 1985-86. Exports from April to August this year has almost crossed the Rs. 100 crore mark.

Industry leaders are jubilant over the restoration of duty drawback to ten per cent announced by the Finance Ministry recently. It has particularly helped restore the confidence of small-scale exporters who lost money because of the unexpected reduction in drawback rates from ten to five per cent.

Mr. J. G. Patel, Chairman of the Dyestuffs & Dye Intermediates sub-committee of the Indian Chemical Manufacturers Association (ICMA) said that the industry was grateful to the Government for its prompt decision to restore the drawback rate. He thanked all the officials concerned, especially Mr. Shyam Suri, Joint Secretary (Chemicals) for being always accessible and ready to help solve the industry's problems.

He hoped the Government would now expedite the scheme for supply of vital raw materials like benzene at international prices. He also pleaded for increase in the cash assistance (CCS) enjoyed by the industry to compensate for numerous indirect taxes which is difficult to identify and quan-

tify case by case. This will provide a new fillip to the industry in the backdrop of sluggish demand at home and booming demand abroad. Despite the phenomenal growth in exports, India's share in the global dye and pigment market was only four per cent, he pointed out.

Mr. Ramu Deora, Chairman of the Basic Chemicals, Pharmaceuticals & Cosmetics Export Promotion Council (Chemexcil), welcoming the decision, said that increase in exports was attributable to both 'quantity' as well as higher unit value realisation. Thanks to the restoration of drawback rate, exports of dyes, dye intermediates will cross the target of Rs. 400 crores.

He said the only hurdle the industry was facing was that of acute shortage of raw materials. Therefore, it was imperative that the Government expedited implementation of the scheme for reserving ten per cent of the production of public sector corporations for export production.

INDUSTRIAL FILTER ELEMENTS : NRI UNIT TO SET UP FACTORY IN BANGALORE

Ultrafilter (India) Private Limited, an NRI unit promoted by Mr. K. K. Kini in technical and financial collaboration with Ultrafilter GMBH, West Germany, is establishing a factory to manufacture industrial filter elements at Bommasandra Industrial area, on the outskirts of Bangalore.

Mr. Kini, managing director of Ultrafilter (India) said that with the manufacture of filter elements the company would be entering the second phase of its phased manufacturing programme. In its first phase, the company was mainly involved in manufacturing housings and engaging in vendor development.

In the third and final phase, ending 1989, the company proposes to manufacture high-tech compressed air dryers-hand-in-hand it also proposes to set up an integrated research and development facility for industrial filters. The three phases involve a total investment of Rs. one crore.

Mr. Kini noted that while the company had achieved a turnover of only Rs. seven lakhs in its first year of operations, this figure had risen to Rs. 41

lakhs for the year ended March 31, 1988. The company has targetted a turnover of Rs. 1.20 crores by March 1990.

He described the company's collaborator, Ultrafilter GMBH as a small and dynamic company which had captured 55 per cent of the German market in its ten years of existence, the German company had a 26 per cent share in Ultrafilter (India), he added. Ultrafilter (India) is programmed to manufacture a range of filters such as oil removal filters, liquid filters, vacuum filters, sterile filters, dust filters and steam filters; the company has been supplying filters to several original equipment (OE) manufacturers including Atlas Capco, Ingersoll Rand, Kirloskar Pneumatic and Alfa Laval.

Mr. Kini noted that currently industrial filters were mostly being imported and therefore, with indigenous manufacture, his company would be saving in foreign exchange. This import substitution product found application in several industries including pharmaceuticals, fertilisers, electronics, breweries and distilleries, he stated.

The company's Bommasandra factory is scheduled to be inaugurated on October 29 by the Karnataka minister for power and industries, Mr. J. H. Patel.

(Contd. from p. 38)

International prices for plastics have marginally fallen but the landed cost remains almost the same because of the fall in the value of the rupee, processors say. IEL's Rishra plant and Carbide's Chembur plant, both taken over by Abbey Oswal, are expected to begin production of LDPE next year, offering some solace to the industry.

AIPMA has therefore pleaded with the Government to review the import duties on various plastics which now range from 85 to 130 per cent, which a view to make imported prices on par with indigenous prices. The duty on LDPE, for example, is 85 per cent plus Rs. 2,600 specific duty. Plastics, at the same time, has been identified as a thrust sector whose growth is to be encouraged in the national interest.

Incidentally, the recent Government decision to throw open polymer imports to anyone, actual use or otherwise, has had no takers so far, because of the uneconomical cost, given the high rates of duties and the prevailing international prices.

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LAB projects : Govt. in a fix over location

The Union Government is in a fix over deciding the specific locations, where the three short-listed companies should be asked to set up the plants for producing linear alkyl benzene (LAB).

The original proposal of assigning Karnal to Hindustan Lever, Visakhapatnam to Nirma Chemical Works and Uttar Pradesh (near Mathura) to Straw Products has been kept in abeyance in view of the stiff opposition to such allocation from some of the short-listed companies.

The Government is now viewing this proposal and having inter-Ministerial consultations and discussions with the companies concerned on this issue. In fact, pending such a review, the Government has asked the short-listed companies to get the necessary clearances under the MRTP Act without specifying any location of the LAB project they are planning to set up.

These companies have now stated in their applications submitted to the Department of Company Affairs that the location of the LAB project would be chosen by the Government. In other words, they have left the location issue to be decided by the Government.

Although no formal representation on the change in the proposal for location of the three projects has been received by the Department of Chemicals and Petrochemicals, enquiries with the companies concerned reveal that the indecision over the location issue mainly centres round Karnal.

It is learnt that none of the short-listed companies would be keen on setting up the LAB project at Karnal for the simple reason that the proposed refinery there may take a long time to be established. Till it is set up, the project at Karnal would have to depend on either imported N-paraffin or it has to procure this raw material from other domestic sources.

Such uncertainty over the availability of raw material has not affected the other two locations near Mathura and Visakhapatnam. As such the short-listed companies have no reservation about setting up the project in either of these locations.

According to industry sources, Hindustan Lever would not mind setting up the project in UP, as this would

help it meet the LAB requirements of its detergent plants located in north India. Its annual requirement of LAB is estimated at 25,000 tonnes.

With its own LAB project coming up with an annual capacity of about 60,000 tonnes, Hindustan Lever would not only have full control on its main raw material for the detergent plants, but it would also export the remaining 35,000 tonnes to detergent plants of Unilever Plc. located in other countries.

Similar advantage will be enjoyed by Nirma Chemical Works, whose LAB project would meet the raw material needs of its detergent plants. Straw Products, a company belonging to the JK group, will be a new entrant into this area and would have to sell their entire product to the detergent producers in the country and in the export markets.

The three companies were short-listed by the Project Approval Board (PAB), some time ago. While the proposals from Hindustan Lever and Nirma were cleared by PAB in June last, Straw Products was short-listed last month. Several other industrial houses including Grasim Industries were in the race for these projects. The short-listed proposals are now awaiting the Cabinet clearance. All the projects would have an annual capacity of 60,000 tonnes each.

The country has at present three producers of LAB—Reliance Industries, Tamilnadu Petro Products Ltd., and Indian Petrochemicals Corporation Ltd., (IPCL) whose total production would be about 156,000 tonnes per annum against a demand of 120,000 tonnes. Exports have been planned to take care of the surplus production. Sources feel that exports would have to be stepped up once the three new LAB projects are commissioned.

GRASIM's LAB PROPOSAL TURNED DOWN

The Union government has rejected Grasim Industries' proposal for setting up a unit to produce 60,000 tonnes per annum of linear alkyl benzene (LAB). Grasim belongs to the Birla group of industries.

According to information available

plant at a suitable location in either Andhra Pradesh or Uttar Pradesh.

The project cost of the LAB unit was estimated at Rs. 120 crores. This was proposed to be financed by the issue of debentures, foreign exchange loans and internal accruals.

Grasim Industries, incidentally, is dominant in the manufacture of viscose staple and machinery for rayon and synthetic fibre plants.

According to sources the government's argument for turning down the Grasim proposal was that at present there is no scope for sanctioning any further capacity in LAB.

The official assessment is that there is sufficient availability of LAB — a vital input for detergent making — in the country. The three manufacturers of LAB, namely, Indian Petrochemical Corporation Ltd (IPCL), Reliance Industries and the Tamil Nadu Petrochemicals together account for a monthly production of about 13,000 tonnes against a demand of 10,000 tonnes. The Reliance unit has a capacity of 60,000 tonnes, while Tamil Nadu Petrochemicals can produce 50,000 tonnes, the rest is accounted for by IPCL.

In view of the improved availability of LAB in the country, the government has already begun exercises to encourage its exports. In fact, the government had now decided to allow export of 50,000 tonnes of LAB.

Of the 50,000 tonnes to be exported, RIL and Tamil Nadu Petrochemicals will account for 20,000 tonnes each. The balance would be accounted for by IPCL.

FURTHER HIKE 'N DMT, PTA PRICES LIKELY

A further hike in DMT and PTA prices is expected soon, according to informed sources.

The Reliance Industries, the sole PTA producer in the country, is expected to hike PTA price to around Rs. 35,000 to Rs. 36,000 per tonne. It had raised PTA price from Rs. 26,500 to Rs. 32,000 with effect from September 1, 1988.

The Bombay Dyeing, the largest DMT manufacturer in the country, IPCL and Bongaigon Refineries, continue their supplies at Rs. 23,500. Both these public sector DMT manufacturers are expected to increase DMT

October 25, 1988

Small pesticide units face closure

Mr. Mohan Ramanath, secretary, Federation of Pesticides Manufacturers' Association, painted a grim picture about the future of pesticide formulation units in the small-scale sector in the South.

He said steps like requiring basic manufactures of technical grade pesticides to meet the needs of non-associated formulators, imports of certain specific and vital technical grades pesticides by small-scale formulators, diversion of at least 75 per cent of Indian Oil Corporation's Aromex and freezing prices of all technical grade pesticides at those prevailing as on July 1, 1988 should be taken immediately. Failure to do so would not only result in a national loss and waste of precious food and other crops to pests but also lead to the closure of all pesticide formulation units in the small sector in the South.

Addressing a press conference, he said what was painful was the non-availability of Aromex to pesticide for-

mulators. Despite the IOC having large-scale storage facility in Madras, the tanks were empty. Despite high hopes raised following the presentation of this year's Budget in Parliament, the prices of technical grade pesticides had neither come down nor had the availability improved. A scarcity situation had developed which was likely to push the cost of pesticides beyond the reach of farmer.

Manufacturers of technical grade pesticides were expected to sell 50 per cent of their production to non-associated pesticide formulators in the small-sector as per their industrial licence. This had been designed to ensure against growth of monopolistic practices. But most of such manufacturers got over these restrictions by giving consolidated figures to the authorities concerned which were not easily verifiable. If they were asked to submit the breakup of the material distributed to non-associated formulators, the figures could be checked effectively. As against 50 per cent, the supply had been

practically negligible since June this year.

BIO-FERTILISER PROJECT YET TO TAKE OFF

The national project on development and use of bio-fertilisers launched by the Union Agriculture Ministry as a Central sector scheme, has failed to make much headway largely on account of indifference of the States.

One of the vital components of the project, the production of Blue-Green-Algae (BGA) which has been found to be very effective in fixing atmospheric nitrogen in wet-land rice, is way behind target. During 1987-88, the production of this vital input by 49 centres spread over 17 States was just 134.74 tonnes against the target of 490 tonnes.

The States whose performance on this count is particularly bad are "Assam, Bihar, Gujarat, Jammu & Kashmir, Himachal Pradesh, Kerala, Maharashtra, Madhya Pradesh, Manipur, Punjab and Uttar Pradesh. The Union Government has expressed its unhappiness over the performance of the Centres in these States and asked them to take steps to streamline their working.

(Contd. on p. 51 Col. 2 & 3)

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Dyes export likely to overtake drugs

The dyes panel of the Basic Chemicals, Pharmaceuticals & Cosmetics Export Promotion Council (Chemexcil), by achieving the highest growth rate, is poised to displace drugs and pharmaceuticals which has so far enjoyed the number one position.

A review of the council's export targets and achievements for April-August 1988 shows that the dyes panel exports touched Rs. 98.58 crores, representing a 129 per cent growth over figures for the corresponding period of last year.

Panel I, representing drugs, pharmaceuticals and fine chemicals (excluding medicinal castor oil) continued to be the leading export earner, grossing a turnover of 113.34 crores. But exports grew by only 112.9 per cent over last year. If the trend persists, the dyes panel will be designated Panel I in the near future. Chemexcil's panels are numbered according to their turnover.

According to the Chemexcil Chairman, Mr. Ramu Deora, the council's

target of Rs. 1,200 crores for the current year would easily swell to Rs. 1,320 crores if the Government expedited the scheme for supply of raw materials by public sector undertakings at global prices to exporters.

The incentives packaged tax exemption in particular, along with threats to penalise big houses for their "inadequate contribution" to exports have fuelled export drive. Big names like Reliance Industries, Herdillia Chemicals and Nocil are all working to boost exports. The alkali industry is also awaiting incentives to enter the export arena.

A significant feature of Chemexcil's exports is that import content, on an average, is as low as 15 per cent. Chemexcil now ranks fourth among all export promotion councils (after Gem & Jewellery, AEPC and Leather).

Everyone in the industry agrees that dyes and dye intermediates have almost unlimited potential to grow. The

Government has attempted to rectify shortages of vital raw materials like benzene. There are indications that the Government may restore the industry's duty drawback rate to 10 per cent following realisation among top decision-makers that the retrograde step has dampened export drive of this promising sector.

Other Chemexcil panels have also registered a growth. Panel III, representing inorganic and organic chemicals and agro-chemicals during April-August 1988 recorded a turnover of Rs. 44.18 crores, showing a rise of 124.6 per cent over the last year's figure of Rs. 19.66 crores.

Panel IV (perfumes, cosmetics, toiletries, soaps, detergents, fatty acids, textile auxiliaries, henna leaves and powder, processed talc and dehydrated castor oil) notched a turnover of Rs. 45.85 crores for the period, showing a rise of 76.6 per cent over the previous year. Panel V item, agarbattis, recorded sales worth Rs. 3.65 crores, representing a 15 per cent growth over last year's figures.

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ROURKELA FERTILISER PLANT:

Rs. 100-cr revamp scheme proposed

A Rs. 100-crore revamp scheme has been proposed for the Rourkela fertiliser plant of the Steel Authority of India Limited (SAIL).

The scheme is slated for completion in about 33 months from the date of approval. Pre-project activities are proposed to be completed by July 1, 1989, and the project is expected to go on stream by April 1, 1992.

The only captive fertiliser unit for any steel plant in the world, the Rourkela fertiliser plant was installed in 1962 when it was considered the big goat in Asia and projected to be profitable even with the high energy consumption.

Japan is providing soft loan for the revamp plan. Chiyoda Corporation, under whose process the existing plants were built, has shown interest in the revamp. A team of the Overseas Economic Co-operation Fund of Japan is expected to visit India shortly to finalise the tie-up.

According to a recent study, the entire scenario of energy utilisation in the fertiliser industry has changed. After the worldwide energy crisis in 1974-75 that fuelled the energy costs which is Rs. 285 to Rs. 300 per gigacalories (G cal) at Rourkela, innovative designs have sought to bring down energy consumption in the fertiliser field. Today's energy consumption in the fifth generation plants is as low as seven G cal per tonne of ammonia as against 12 G cal in the first generation plants of the sixties.

While effective engineering have brought down energy consumption per tonne of calcium ammonium nitrate (CAN) from 6.100 to 5.715 G cal, the nitrate division of the Rourkela fertiliser plant has been hit for the past four to five years by inconsistent power supply and frequent system disturbances. The corrosive nature of the material handled has further aggravated the situation.

The nitrate plant has had some inherent design defects. The technology is obsolete and suffers from low ammo-

nia efficiency. Therefore, experts feel and the four old units of the CAN plant require energy-efficient equipment.

For the next five years, a phased-out plan has been drawn up for short term additions, modifications and replacements at a cost of Rs. 35 crores. The department of electronics of the Union government has selected Rourkela fertiliser plant for optimisation of ammonia synthesis with the installation of semi computerisation facilities at a cost of about Rs. 80 lakhs of which Rs. 70 lakhs will be borne by the Union government.

According to the study, the fertiliser unit can be made profitable after the technology upgradation. An analysis reveals that with the upgradation of technology and revamping, the fertiliser plant can make a profit of Rs. 24 crores per year as against the present loss of about Rs. 8 crores.

Regarding diversification, the methodology of implementation of a caprolactam project is under finalisation.

The revamp scheme is expected to result in a net annual benefit of Rs. 14 crores. The payback period is only 3.5 years. The productivity is expected to go up from 60 to 100 per cent of the rated capacity with power requirement of 24 mw.

DCM NOT TO SELL KOTA COMPLEX

The DCM management has, more or less, moved away from the proposal to sell its Kota complex, and is now busy working out the modalities for dividing the company into three separate units.

The sale of the Kota complex has been virtually abandoned, partly because only one concrete bid has come in for the complex of fertiliser and chemical units, and partly because the management itself has been divided on the sale issue. Opposition to the sale has been led by chairman Bansi Dhar.

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MP seeks another fertiliser unit

Madhya Pradesh has approached the Centre for sanctioning another fertiliser unit to the giant gas based fertiliser plant commissioned in Vijaipur by the public sector National Fertilizers Limited (NFL).

The state government has pointed out that the existing unit of the Vijaipur fertiliser project, commissioned last December, has helped to remove the backwardness of this part of the Malwa region. Adding another unit to the project would certainly enhance the use of fertilisers in local farming and accelerate economic activity, according to Mr. Digvijay Singh, the local Member of Parliament.

Mr. S. N. Jain, NFL managing director said the company would favour doubling of the Vijaipur project as it had all the infrastructural facilities ready for putting up another plant at the site.

NFL's Vijaipur plant with a daily production capacity of 2,200 tonnes of urea is the first of six inland fertiliser units utilising the Bombay High offshore

gas fed by the HBJ pipeline. The larger availability of offshore gas has opened up bigger possibilities for the gas based units on the HBJ pipeline.

Mr. Jain said doubling the production at Vijaipur through another unit would cost Rs. 520 crores as against Rs. 700 crores for putting a new unit at a new site. NFL would be ready to contribute about Rs. 300 crores for the project from its internal resources. The second unit could be done in 33 months, he added.

Mr. Jain pointed out that although the modern and well managed fertiliser units employed less people for plant operation, it generates lot of employment in related areas.

The Vijaipur plant has an annual installed capacity of 7,26,000 tonnes of urea.

With the commissioning of the Vijaipur plant, NFL that has production units at Nangal, Panipat and Bhatinda has become the top ranking fertiliser maker.

It has an annual production capacity of 2.07 million tonnes of urea, 3,26,000 tonnes of calcium ammonium nitrate fertilisers serving states from Jammu Kashmir to Karnataka.

Bulk of NFL production is marketed in Punjab, Haryana, Rajasthan, Jammu Kashmir, Madhya Pradesh and Uttar Pradesh. It has a share of the fertiliser market in Andhra Pradesh and Karnataka.

LICENCE NORMS FOR GENERATOR IMPORT BY FACT

The government has notified licensing conditions for the import of equipment and services under a credit limit of 2,000 billion yen for installation of an additional power generation facility (100 mw stream turbine generator) at the chin division state-owned Fertiliser and Chemicals (Travancore) Ltd. (FACT).

According to a public notice issued by the chief controller of imports and exports on October 4 last import licences under the credit extended by the Overseas Economic Cooperation Fund of Japan (DECF) can be issued only for such items and such values as have been specifically cleared by the DGTE capital goods committee. The value of import licences should not exceed yen 2,200 billion (CIF).

The rupee value of the import licences will be determined with reference to the exchange rate notified by the department of revenue (customs) and prevailing on the date of issue of the import licences. These can be issued only in favour of FACT on CIF basis.

The extension of the validity of the import licences may, on an application by the importer, be granted upto a further period of 12 months, it is stated.

Imports to be financed under the credit are restricted to the list of goods and services attached to the import licences duly attested by the licensing authorities.

No remittance of foreign exchange will be permitted against the import licences. Any payment towards the Indian agent's commission should be made in India. Such payments, however, will form part of the licence value and will, therefore, be charged to the licence.

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ADVT - 2

Deepak Fertilisers to diversify in industrial chemicals

Deepak Fertilisers and Petrochemicals Corporation has chalked out a massive diversification programme in the field of industrial chemicals, namely nitric acid, ammonium nitrate and methanol. The cost of the diversification is estimated to be Rs. 346 crores, according to Mr. C. K. Mehta, Chairman and Managing Director. The diversification will be carried out at its existing fertiliser complex at Talaja, near Bombay.

To raise a part of the finance for the multi-crore diversification programme, the company will subject to usual consents, enter the capital market with a huge convertible debenture issue of Rs. 190 crores, a portion of which will be offered to the existing shareholders on a rights basis worth Rs. 60 crores. The public issue is expected to be made in January, 1989. The terms of the issue are under discussion with the authorities and will be announced soon.

The face value of the debenture is likely to be Rs. 100 and the interest rate may be 14 per cent per annum.

Talking to newsmen informally in Bombay on October 14, after the board meeting, which was called to consider the proposed convertible debenture issue, Mr. Mehta said that the civil work would start next month. The diversification is expected to be completed partly in October, 1990, and the balance in March, 1991, and the full benefit would accrue to the company from 1992 onwards. The diversification is based on gas. The company would get its gas supply from its own pipeline, enabling it to save on transportation costs and also save on raw material costs too.

Mr. Mehta stated that the implementation would transform the company from a single-product entity to a multi-product, broad-based enterprise, with a strong base in the sunrise industries of petrochemicals, basic industrial chemicals and cost-effective fertilisers.

Outlining the new projects, Mr. Mehta said that it is proposed to convert, by way of forward integration, the entire production of ammonia into high value-added products which have a ready and rising demand. Ammonia would be utilised to produce dilute ni-

tric acid which, in turn, would be a raw material along with ammonia for the manufacture of ammonium nitrophosphate fertiliser, low density prilled ammonium nitrate and concentrated nitric acid.

Besides, he added, the company is also setting up a plant for the manufacture of methanol on gas as the main raw material. This would not only optimise the utilisation of its existing gas pipeline but would also gainfully use the carbon dioxide presently being vented from the existing ammonia.

He further emphasised that as the gas pipeline is owned by the company and gas being the basic raw material for all the products proposed to be manufactured, it would give a significant built-in cost advantage to the company over other manufacturers.

The Chairman revealed that the company had entered into technical collaboration with the world renowned process licensors, namely, Weatherly Inc.

(US), Stamicarton B. V. (Netherlands) and Adolf Plinke Sohne Chemiele (West Germany) for weak nitric acid, ammonium nitrophosphate/prilled ammonium nitrate and concentrated nitric acid respectively. The low energy methanol plant is being set up in collaboration with ICI-Davy McKee (UK).

All the necessary Government approvals for these projects, including technical collaboration agreements, capital goods imports and clearance from pollution, environmental and other angles had already been obtained. The financial institutions have also completed the appraisal of the projects, he added.

He pointed out that on completion of the diversification, the company's annual turnover would jump to over Rs. 250 crores from the present turnover of nearly Rs. 42 crores.

Mr. Mehta said that the company's current performance is also encouraging, with its sales jumping by about 60 per cent to Rs. 23 crores during the first six-month period ended September, 1988, from Rs. 14 crores in the corresponding period last year. Its liquid ammonia plant is operating over 100 per cent capacity.

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Chemical industry plea for export incentives

To help the chemical industry achieve the export target of Rs. 1,900 crores this year and increase it later, several steps should be taken betimes, the Indian Chemical Manufacturers Association feels.

While policies and procedures have been liberalised in the case of several sectors of industry, the Association has noted that the benefits of liberalisation have not been extended to the chemical industry.

The other constraints relate to broadbanding, re-endorsement of capacities and conditions for foreign collaborations, a representative of the industry has said.

He underscores the fact that the chemical industry is both "import substituting and export promoting."

Referring to the reduction in the duty drawback rates for export of chemicals, he says that this was probably done due to lack of data. While major manufacturers submitted the data in time and in full, the small-scale

units had problem in submitting the data in the prescribed elaborate proforma.

Several exporters had calculated their probable profit, assuming that the duty drawback would be at 10 per cent. A sudden halving of it would affect them seriously. The association wants that at least for the contracts already in the pipeline the duty drawback should be at the old higher rate. The cash compensatory support should be more supportive.

Since the chemical industry is expected to increase its exports by more than 48 per cent over 1987-88 level, the credit limits of exporting units should be increased. Otherwise the exporters would have to pay commercial rate of interest on their credit above the existing limits.

Amplifying the need to broadband, the representative says that, for instance, the dyes and dyestuff sector could be allowed to have broadbanding facility easily, since their manufacture is

by similar type of reaction and, with marginal change in equipment, the demand of a wide section of consumer of dyes and dyestuffs could be met.

For example, azo dyes, direct dyes, disperse dyes, basic and polymethine metal complex dyes, mordant dyes, leather dyes, organic pigments, reactive dyes and certain fluorescent brighteners could be grouped into one band.

These are being manufactured mainly by condensation reaction. Besides, he has pointed out that some countries have banned the manufacture of dyes and dyestuffs since this causes pollution problems according to their standards. Here is an opportunity to increase our production and exports.

The Association says that since it has been clarified that locational restrictions would not apply in the case of units expanding to minimum economic size of operation, logically capacity re-endorsement and the automatic expansion scheme should also be freed from the constraint.

To prevent pollution hazards, the concerned units might be asked to ensure that increased production would not affect the quality of environment.

In the case of foreign collaboration approvals, the standard approval letter now stipulates that the first instalment is payable only after obtaining capital goods clearance. This procedure causes delays and might not be insisted upon. There could be a provision for payment of fees initially on a limited disclosure basis, the Association has suggested.

Several members of the Association have complained about the poor quality of infrastructure facilities in industrial estates and zones. Industries located here have to spend a lot of money to get facilities. Often this amount is more than the subsidy they receive.

According to the Association, a major problem is the sudden shortage of several raw materials like benzene and toluene. Surpluses and shortages are cyclical phenomena in the chemicals market. As spot buyer India has faced problems of tying up adequate supplies

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Raw material scarcity hits plastic units

Frequent and steep increases in prices of petrochemicals products by the primary producers as well as a shortage of the same in the domestic market is creating serious difficulties for a majority of tiny and small-scale plastics units spread throughout the country.

According to the Indian Plastics Federation (IPF), acute shortage of raw material and frequent upward price revisions by leading domestic producers had virtually brought the country's plastics industry, which employs several lakhs of unskilled and semi-skilled workmen, to its knees and a large number of units were on the verge of closure.

Indian Petrochemicals Corporation Ltd. (IPCL), the largest supplier of petrochemicals raw material in the domestic market, has steadily increased the price of moulding grade low density polyethylene (LDPE) from Rs. 25,500 per tonne in April 1987 to Rs. 34,600 per tonne at present. Similarly, price of GP grade LDPE went up from Rs. 25,000 per tonne to Rs. 33,100 per tonne and that of coating grade LDPE from Rs. 26,000 per tonne to Rs. 36,000 per tonne over the same period.

In the case of polypropylene homo polymer, IPCL hiked its prices from Rs. 28,300 per tonne to Rs. 31,000 per tonne for TQ grade, Rs. 27,300 per tonne to Rs. 30,000 per tonne for GP grade and from Rs. 28,800 to Rs. 32,000 per tonne for special grade over the same period. Rates for PVC resins also showed similar increase. What is causing concern to the plastics industry is the fact that domestic producers have been raising prices of their products even though the price of naphtha, their own basic raw material input, has not been increased during this period.

Mr. M. L. Lahoti, president IPF, told newsmen recently that the Centre should take immediate steps to make available raw materials to all processors throughout the country at a uniform price and create buffer stocks for regular supply. While import duty should be reduced so that the landed cost of imported material was brought down to the pre-budget prices of indigenous raw materials, suitable modalities should be worked out so that do-

price escalation norms fixed by the Centre.

The long-term solution to the problem would be to draw up a perspective plan for creation of additional capabilities for production of plastic materials in all the regions. And as plastics played a vital role in agriculture and irrigation, the naphtha used for petrochemicals should also be rated at par and priced at the same level as that used for fertilisers, he said.

Highlighting the problems faced by plastics units in West Bengal, Mr. Lahoti said that the state government should reduce the present high incidence of taxes and levies.

(Contd. from p. 45).

As per the approved financial pattern of the scheme, the Department of Agriculture and co-operation provides grant to State Governments to the extent of Rs. 30,000 (Rs. 20,000 non-recurring and Rs. 10,000 recurring) for production of BGA. The non-recurring grant is provided in the first year of the approval of BGA sub-centres while recurring grant is provided per

annum to each BGA sub-centres for production of 10 tonnes of BGA per annum.

Several States have yet to do anything tangible for the setting up of rhizobium production units. Under an ambitious project, one national and six regional bio-fertiliser development centres were to be established as subordinate offices of the department which will produce effective strains of 37 tonnes of rhizobium culture per annum.

As a part of this exercise 20 rhizobium production units have to be established by the State institutional agencies like agro-industries corporation and State co-operative marketing federations. As per approved financial pattern the Ministry of Agriculture provides grant to the extent of Rs. 13 lakhs for equipment, glasswares and chemicals.

For establishment of regional centres of bio-fertilisers at Hissar, Jabalpur, Pune, Bangalore, Bhubaneswar and Shillong, the Centre has requested the respective State Governments to provide suitable land of about 122 hectares to set up these centres on a permanent basis.

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Balco pulled up for low capacity utilisation

The Department of Mines has pulled up Bharat, Aluminium Company Ltd. (BALCO) for low capacity utilisation.

Fixing a production target of 100,000 tonnes of metal for 1989-90, it has directed the company to take all necessary steps to fulfil it and raise the capacity use to 100 per cent within a specified time frame.

It has also admonished the company for fall in production of alumina and high energy consumption.

The company has also been asked as to why it has put a target of consolidated loss of Rs. 5.5 crores for the current year in the action plan.

The company's output of saleable aluminium products during April to June has been 92.7 per cent of the target. The capacity utilisation has been 87 per cent. The total production during April-September has been put at 45,754 tonnes as against the target of 47,500 tonnes.

The decrease in capacity use which was 96.5 per cent in 1985-86 and

1986-87 has deeply concerned the Government. It has asked the company why it cannot improve it.

The reason given by BALCO is that the technology of its smelter at Korba is outdated and only with its modernisation can there be a possibility of reduction in power consumption and consequently the increase in production.

To the Ministry's suggestion that the company should consider the addition of a few more pots in the smelter in lieu of those under maintenance for raising output, BALCO explains it will involve providing large number of huge bus bars which will consume the entire aluminium output by the company towards making the bus bars. The company will thus not be able to earn anything through sale for at least about two years.

As regards aluminium, the annual target has been kept at 188,000 tonnes. The target fulfilment for the first quarter was only 92.7 per cent. For the fall in output, the company holds

the quality of bauxite from Phutkapahar responsible. Since it contains high percentage of silica, production of alumina is less and consumption of basic raw material i.e. caustic soda higher.

The department has asked the company to obviate the use of high silica bauxite, less bauxite should be mined from Phutkapahar and larger quantity with less silica percentage should be purchased from outside.

The Department has also directed the company that it should decide on a specific percentage of silica in bauxite from captive mine beyond which the mining should be stopped. For the next year, the alumina production target has been fixed at 194,000 tonnes.

The Department has also taken the company to task for delay in obtaining the mining lease in respect of bauxite deposits in Mainpat in Madhya Pradesh. The company has been directed to assign the responsibility of pursuing the matter specifically to the concerned officer in the company so that he may constantly check from the Department of Mines and the State Government the position of the company's application on the recommendation of the Indian Bureau of Mines.

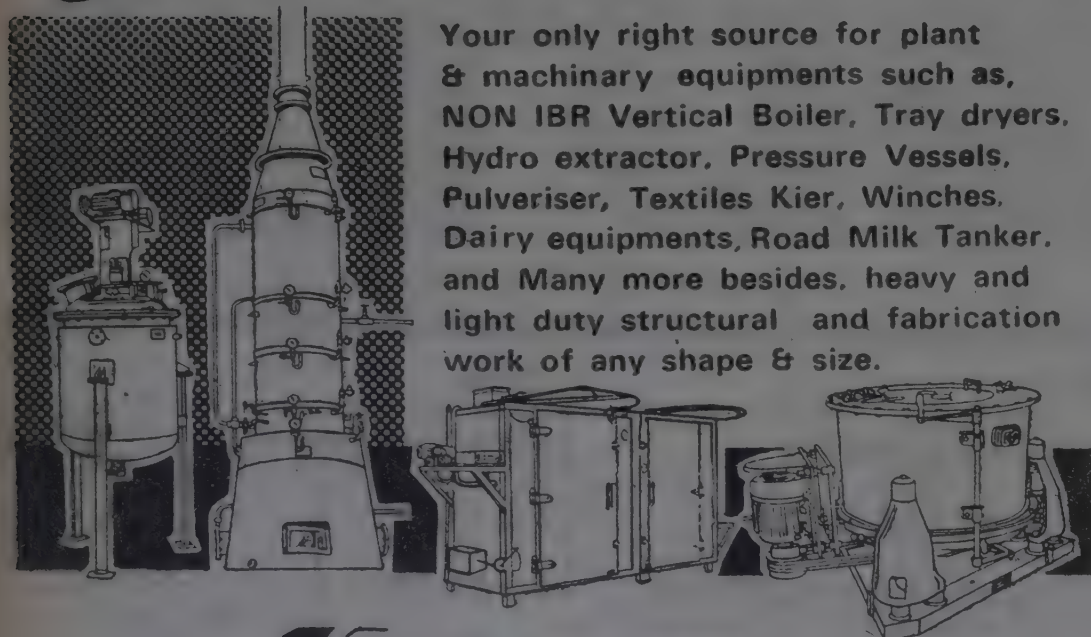
As regards the financial performance of the company, the department has asked the company as to why it has put a target of consolidated loss of Rs. 5.5 crores for the current year in the action plan particularly in view of the profits of Rs. 8.31 crores in 1987-88. The company has informed the Department that it may be able to earn a modest profit at the close of the year.

As regards power consumption in the smelter, it is observed that the consumption for producing one tonne of metal during April-June was 17,538 units and during April-August 17,295 units.

The company's explanation is that the higher consumption of power in the smelter was due to frequent power interruptions and outages from Madhya Pradesh Electricity Board. The company estimates 18,200 units of power per tonne of metal in the current year.

The Department has taken serious note of it and asked the company to take steps to bring it down.

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Chemical Reaction Engineering (CRE)

The August 1988 issue of *Chemical Engineering Science* is devoted to the Tenth International Symposium on Chemical Reaction Engineering (ISCRE-10) held in Basle, Switzerland (29 Aug. - 1 Sep. 1988). There were seven Plenary Lectures by Villadsen (Reactor Modelling), Engasser (Bioreactor Engineering), Sharma (Multiphase Reactions), Gygas (CRE for safety), Paul (Design for Speciality Organic Chemicals) and Widerkehr (Process improvements in fine chemicals industry). The Symposium attracted more than 400 participants from all over the world and there was a declared special emphasis on Fine Chemicals consistent with the locale.

In biotechnology main research efforts should be geared towards the increase in bioreactor productivity, the development of continuous processes, the scale-up and automation. Higher productivities may be realised through genetic improvements of living cells or by operating reactors under high cell densities.

In the manufacture of fine chemicals, it often pays to adopt two-liquid phases. The use of PTC has revolutionised many processes. The selectivity can be manipulated through the management of micro environment (micelles, microemulsions, hydrotropes, etc.) on microenvironment (zeolites, clays, cyclo dextrins, etc.). Photochemical route may well have attraction.

The use of reaction calorimetry for assessing the reactor safety has been emphasised. The development of intrinsically safe processes is attracting attention.

The use of two-phase alkaline hydrolysis of a formate ester in the manufacture of the antibiotic Primaxin has been brought out by Merck. The use of molecular sieve 3A or 4A to mop-up HCl in a process has also been indicated. The importance of micromixing was brought out in several papers.

The Li (in NH_3) catalysed reaction between α , β unsaturated ketone and acetylene was improved through a series of CRE based principles; a substantial improvement in the raw materials require-

ments was realised along with a drastic reduction in the effluents.

Technical Sessions included: Modelling and Control; Biotechnology; Mixing; Special reactor systems and chemicals; Emission Control and recycling; Safety; Multiphase reaction; Catalytic reactors.

Frey and Denson have devised a simple reaction between phthalic anhydride and *p*-phenylene diamine to study micromixing in polymerization reactors.

Irandoust and Andersson have studied liquid-phase reactions in a segmented two-phase flow monolithic catalyst reactor. High interfacial areas are generated in such a reactor.

Wang and Weng have brought out the role of the third liquid phase in a PTC catalysed reactions of benzyl chloride to benzyl bromide.

Westerterp *et. al.* have discussed different types of hydrogenators for fine chemicals industry.

Two papers on methanol synthesis in slurry reactors were presented. The role of vapour-liquid equilibrium in a trickle bed reactor has also been emphasised.

Great expectations -- the tale of biotechnology

R. Bud has given a very lucid account of this subject on which apparently the first editorial appeared in *Nature* in April 1933. In 1937 Julian Huxley had said "Biology is as important as the sciences of lifeless matter; and biotechnology will in the long run be more important than mechanical and chemical engineering". In 1962, the *Journal of Biochemical and Microbiological Technology and Engineering* (founded in 1959) was renamed as *Biotechnology and Bioengineering* by Elmer Gaden.

"Biological processes can produce complex products, but they tend to be slow, suffer from contamination, and the products are mixed and expensive to separate". While the application of biochemical engineering was broad, the successful innovations fell short of the hopes of the post-war years.

Chavin Weizmann's acetone process developed during the Second World War was one of the most

glamorous achievement of British Science.

Bud says "As we move towards the 1990s it is clear that whatever its importance genetic engineering has not superseded the previous achievements". Many forecasts made in 1980 have proved to be wrong; it was hoped that in 1990 biotechnology market would be \$27 billion! Fears have been expressed that chemistry and biology are not coming together although biochemistry as a subject was specifically developed to achieve this cherished goal! (*Chem. Brit.*, 1988, 24, No. 5, 441).

ECN, 1988, 51, August 8/15, p. 32-33, has also covered Biotech. "The thrill and suspense of the biotechnology is still here today, but much of it has been tempered by a more realistic view and expectations of the technology and what it can do". For instance Tissue Plasminogen Activator, touted to be biotech's first one billion dollar drug has come under criticism for its price and effectiveness.

Microemulsions (ME)

ME are thermodynamically stable droplet type dispersions of oil in water (or vice versa) with a surfactant and a co-surfactant, with droplet size typically in the range of 100 to 1000 Å. ME properties are extremely varied and hence the extreme diversity in their practical applications. Apparently, a ME*, without this specific nomenclature, have been used by the Australian housewives since the beginning of this century to wash wool. (* a mixture of water - eucalyptus oil - soap flake - white spirit).

It is known that phase inversion can occur and evidence of the existence of biocontinuous structure exists. The size of droplet can be calculated.

ME can co-exist with many different types of other phases: oil, water, liquid crystals, or other microemulsion. It seems four different phases have been observed.

An important disadvantage of ME is the requirement of a large amount of surfactant (detergentless ME are known). A recent development has been the existence of "giant" ME with droplet sizes of 6000 Å. (D. Langevin, *Acc. Chem. Res.*, 1988, 21, No. 7, 255-260).

ME continue to attract attention of research workers throughout the world and we have regularly covered the topic in this monthly feature. Ternary mixtures of water, oil and non-ionic amphiphile may separate into three liquid phase -- an aqueous, an

amphiphile (ME), and oil-rich. Temperature, amphiphile wt. fr. influence the phase diagram. Kahweit et. al., have discussed this subject and have considered the phase behaviour which may well evolve from a tricritical point. (*Langmuir*, 1988, 4, 785).

Friberg and Rong have discussed phase equilibrium in non-aqueous ME systems; the effect of low concentration of surfactant in formamide, sodium dodecyl sulphate, hexanol and toluene system has been studied. These authors believe that ME are in fact non-structured solution (*ibid*, 796).

Puig et. al., have reported phase behaviour in 3 and 4 components ME's. (*ibid*, p. 806).

Prausnitz has discussed thermodynamic aspects of ME. (*A.I.Ch.E.J.*, 1988).

Aminothiophenols (ATP)

Celanese hold a patent for the conversion of para acetyl phenol to paracetamol via oximation and Beckmann rearrangement. Now this company has further extended this reaction scheme. Paracetamol is deprotonated with KOH in MeOH and acylated with ClC(S)NMe₂ to give 4-[-Me₂NC(S)O] C₆H₄ NHAc; rearrangement in sulfolane at 280°C gives 4-[-Me₂NC(O)S] C₆H₄ NHAc which in turn on saponification with KOH in aq. HOCH₂CH₂OH gives 4 HSC₆H₄NHAc. (E.P. Appln. 251,552, 1988; *Cf. Chem. Abstr.*, 1988, 109, 37598).

1,2,3 and 1,2,4-Trihydroxy- and alkoxyhydroxy benzenes

Degussa have claimed that the chemicals under reference, which are useful as agrochemicals, photochemicals, pharmaceuticals, etc. can be made by reacting molten resorcinol with perpropionic acid in benzene. (Ger. Offen DE 3,632,075, *Cf. Chem. Abstr.*, 1988, 109, 37599).

Micelles vs. cyclodextrins (CD): Esterolytic reactivity

U. Tennellato et. al. have brought out analogies and differences in the reactivity in functionalized micellar aggregates and natural or modified cyclodextrins. Rate enhancements in the loosely ordered micellar aggregates are amenable to predictions; selectivity is not readily manouvreable. Reactivity in CD is not easily predictable; high selectivity may be realised. (*Bull. Soc. Chim. Fr.*, 1988, No. 2, p. 297).

Derivatives of 2,3,6 trimethyl hydroquinone (TMHQ) as adrenergic drugs

A Czech patent claims that the 4-acetoxy derivative of TMHQ can be converted to the corresponding 2,3 epoxy propane derivative at the free OH location and this derivative is then reacted with isopropylamine to give 1-(4-acetoxy-2,3,5-trimethyl phenoxy)-3-(isopropylamino)-2-propanol which is useful as an adrenergic drug. (*Chem. Abstr.*, 1988, 109, 22643).

Serendipidity in Chemistry, Astronomy, etc.

The role of serendipity in research has been crucial all along and we have covered this subject in this column in the past. Now Hannan, Roy and Christman have given a lucid account of this subject. Even the oscillating reactions observed during cobalt catalysed oxidation of benzaldehyde by Jensen's group at Du Pont was due to serendipity. It is interesting that during experiments on the photo-induced emulsion polymerization of styrene it was found that magnetic effects are important when a magnetic stirrer was used!

The use of dimethyl glyoxime took a different turn when during prohibition days in USA acetone was used in place of ethanol.

Radar was also developed due to an unusual observation at NRL, USA. (*Chemtec.*, 1988, July, p. 402).

NEW DEVELOPMENTS IN SEPARATIONS

Macrocycle-mediated cation separation

Macrocycles like crown ethers have unusual properties of complexing with cations in a selective way. Izatt et. al., have studied liquid membrane systems consisting of the bulk, thin sheet supported, hollow fibre supported and emulsion types. The separations of Sr (II) from Ba (II) and of Hg (II), Cd (II) and Zn (II) from each other using 8-crown-6 type macrocycles and the separations of Ag (I) from Pb (II) using pyridino and triazole type macrocycles are discussed. (*Pure & Applied Chem.*, 1988, 60, No. 4, 453).

Recovery of ethylene from cat-cracker gases

In view of the world-wide shortage of ethylene, apart from revamping and new olefin crackers, the recovery of ethylene from lean streams is being considered. The Mobil-Badger process can use even less

than 20% ethylene containing stream for ethyl benzene. Typically cat-cracker gas (after C₃/C₄ recovery) contains about 14 to 16% ethylene. Cryogenic separations have been considered. A number of modifications are being considered, including adsorptive separations. (*Chem. Week*, 1988, 11 May, p. 16).

Membrane Separations

This is now attracting much greater attention and companies originally working with cryogenic operations like Air Products, BOC, Air liquids, etc. are joining hands with companies like Du Pont, Dow Monsanto etc. When the purity requirements are not very stringent and capacity is small to medium (eg. <99% purity Nitrogen at less than 30,000 cu. ft. per hour) the membrane process scores over adsorptive and cryogenic processes.

For nitrogen separation IMS has developed an ultra-thin film laid down on polysulfone fibre which is highly selective and order of magnitude more permeable than materials available hitherto. (*Chem. Week*, 1988, June 8, p. 29).

Oxygen from air and water

Aquantics is developing a new process which uses a synthetic absorbent which takes up oxygen and subsequently this is released in an electrochemical cell (U.S.P. 4,609,383). A hollow fibre, microporous membrane takes up O₂ from air or even water oxygen, with a purity higher than 99% can be obtained. This process seems to particularly well suited to small scale operations. (*Chem. Week*, 1988, 4 May, p. 16).

Partially chlorinated epoxidised oils

Gull (of Hüls, W. Germany) has shown that partially chlorinated soyabean oil, containing 3-5 wt% Cl, and partially chlorinated linseed oil (or the corresponding methyl ester) with 4.5 - 6.5 wt% Cl, when epoxidised give a considerably better plasticizer from the point of view of initial colour and other properties. (*Fat Sci. Technol.*, 1988, 90, No. 5, 200).

Separation of enantiomers by clathrate formation

Worsh and Vogtle have given a very useful treatise on this subject which is of great relevance in drug

and agrochemical industries. The ability of chiral host substances to differentiate between guest substances included within their molecular or crystal lattice cavities by diastereomeric interactions is utilised for separation. It is essential that no covalent bonds are formed between host and guest molecules; the differentiation is effected only by the 'chiral (spatial) environment'.

A number of clathrates were found to be formed by chance. However, now some criteria are available. Substances like urea, cyclodextrin, binaphthyl, TOT, brucine, etc. are good hosts. A number of examples of industrial importance for resolution of racemates are given. (*Topics in Current Chemistry*, 1987, vol. 140, p. 22, Springer-Verlag, Berlin).

Biological elimination of ammonium ion at high concentrations in waste water

Brauer and Hefin-Omar have shown, through a two-stage pilot plant, that substantial reduction in dissolved organic compounds and ammonium ion can be realized in an aerobic biological process with a special design of reactor, referred to as the reciprocating jet bioreactor. An organic load of 12 to 15 kg COD/cu.m. and an ammonium ion load of 1.3 to 1.7 kg NH_4^+ /cu. m. were reduced to about 10%. (*Bioprocess Eng.*, 1988, 3, 51).

Enzymatic production of L-tryptophan (T) in a reverse micelle reactor

Eggers and Blanch have shown that the enzymatic production of T can be conducted with reverse micelles of surfactant BRIJ 56 in cyclohexane; the substrates were indole and serine. They also used an anion exchanger to facilitate the transfer of T and serine between the water pool of the reverse micelle and the bulk of organic phase. It was observed that the enzyme was more stable in the reverse micelles than in bulk water.

A continuous reverse micelle reactor design has been proposed which accommodates both product recovery and enzyme reactivation. (*Bioprocess Eng.*, 1988, 3, 83).

Ammonoxidation of methylpyrazine (MP) to cyanopyrazine (CP)

Forni has shown that Sb-V-Mn oxides based catalyst, at 573-673K and steam, allows the ammonoxidation reaction under reference. The apparent

reaction order with respect to MP was found to be minus 0.4. The reaction selectivity strongly depends on the partial pressure of reagents. (*Applied Catalysis*, 1988, 37, 305).

Ethylene and propylene from methanol with zeolites as catalyst

Riekert and co-workers have shown that ZSM-5 catalyst, agglomerated by extension to cylinders, rings and monoliths, in a two-stage fixed bed reactor, at 300°C allows 60% yield of ethylene and propylene at 50% conversion. (*Applied Catalysis*, 1988, 37, 139-174).

Glycol Ethers with clay catalysts

B.P. (U.K.) have claimed that rare earth cation-exchanged lamellar clay (montmorillonite) catalysts are good for making glycol ethers. Thus ethanol and propylene oxide react at 80°C and 30 atm to give the corresponding ether. (E.P. Appl. 250168, 1987, Cf. *Chem. Abstr.*, 1988, 109, 39733).

Ammonia-Hydrazine conversion processes

Hayashi and co-workers have considered alternative routes for hydrazine from ammonia which avoids the use of NaOCl. In a recent version they have suggested that benzophenone (BP) can be reacted with ammonia to give the imine which in turn can be oxidised to the BP azine. The BP azine can be hydrolysed in a two-phase system with aqueous 2N sulphuric acid, using xylene or 1,1,2 trichloroethane as a solvent. This reaction is greatly catalysed by a small amount of dodecylbenzene sulphonic acid which shows a good distribution coefficient. (*Applied Catalysis*, 1988, 41, 213-224).

Electrochemical waste water treatment

Comninellis and Plattner have presented a new method which allows an assessment of the potential of electrochemical oxidation (EO) of organic compounds through an EO Index and the degree of oxidation through EO Demand. Aqueous solutions of phenol, aniline, etc. have been treated through EO.

The proposed method, through the use of a Pt anode in alkaline medium (pH=12), shows that only benzene derivatives of which the substituents are electron donating (e.g. NH_2) are efficiently oxidised giving maleic acid as product. (*Chimia*, 1988, 42, No. 7/8, p. 250).

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Bhatnagar awards presented

"In trying to develop technologies primarily towards import substitution we are always lagging behind by a generation or two technologically and we are never upfront," observed the Prime Minister, Mr. Rajiv Gandhi, in New Delhi on Oct. 17. Mr. Gandhi was addressing a gathering of scientists at the presentation ceremony of the Shanti Swarup Bhatnagar Awards of the Council of Scientific and Industrial Research (CSIR) for the year 1987.

"A new thrust to science and technology," he said, "is to target them at the cutting edge of technology." This, he said, would give time and flexibility in converting research and development efforts into products that were in the forefront. He called for "concentrating on a few areas but at the same time emphasised the need to broaden our outlook on areas where we can be upfront."

"The primary problem we face in India is removal of poverty and the litmus test for any of our activity is how it can help in this," the Prime Minister said. He asked the scientists to direct scientific activity so that it looks more specifically towards remo-

val of poverty. There are, in fact, aspects of science and technology which go beyond the limits of directly removing poverty, he added.

Three awardees absent :

The Prime Minister presented seven of the nine Bhatnagar prizes in six scientific disciplines announced for 1987. Three of the awardees were abroad and could not be present to receive the awards. However, on a suggestion from the Prime Minister, the award to Prof. Sudhir Kumar Sopory of the Jawaharlal Nehru University, who gets it in the field of Biological Sciences jointly with Prof. Awadesh Surolia of the Indian Institute of Science, Bangalore, was received by his wife.

The six prize winners who received the awards from the Prime Minister included the following: Prof. Probir Roy of the Tata Institute of Fundamental Research (TIFR), Bombay, who gets the award in the area of Physical Sciences for his "contributions to theoretical high energy physics especially to the phenomenology of deep inelastic lepton-hadron-photon processes, ultra-light neutrinos in supersymmetric grand unified theories and of Higgs Boson

signals and mass limits in supergravity theories."

The Biological Sciences award for Prof. Surolia was made for his outstanding contributions to the understanding of the biological activities of lectins. "His findings have helped in the understanding of carbohydrate-mediated recognition processes in biological systems", the award citation said. The joint award in the area to Prof. Sopory goes for his significant contributions in the field of physiology of plant growth and development. "His researches have led to a better understanding of the mode of action of phytochrome and the possible involvement of calcium in higher plant cells.

Prof. Shrikant Lele received his award made to him in Engineering Sciences for his contributions to the advancement of knowledge in structural metallurgy through his original work on faulted close-packed crystals-silicon carbide, alloys and quasicrystals. The award in Earth Sciences went to Prof. Pramod Sadasheo Moharir for "his contributions to the problems of geophysical signal processing, modelling earthquake sequences and design of numerical algorithms for modelling some earth systems.

The Bhatnagar prize in Mathematical Sciences went jointly to Dr. (Ms.) R. Parimala and Prof. Tarlok Nath Shorey, both of the TIFR, the former getting for her "significant contributions to the study of quadratic spaces over polynomial rings, to the classification and composition theory of quaternary quadratic modules over arbitrary commutative rings and to the determination of Witt groups" and Prof. Shorey for his "contributions to Transcendental Number Theory, in particular best estimates for linear forms in logarithms of algebraic numbers, and ingenious and original applications of Baker's Method to diophantine equations and Ramanujan's tau-function.

Apart from Prof. Sopory, the other two absentees were Prof. Vijay Kumar Kapahi of the Bangalore Centre of the TIFR, who has been awarded for his distinguishing work on extragalactic radio sources and observational cosmology, and Prof. Debashish Mukherjee of the Indian Association for the Cultivation of Science, Calcutta, for "contributions in theoretical chemistry and particularly in the pioneering development of open-shell coupled cluster theory of molecular electronic structure.

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Three share Nobel prize for medicine

Briton George Black and US research partners Gertrude Elion and George Hitchings shared the Nobel prize for medicine for research that has led to new drugs for a wide range of diseases, including AIDS.

Sweden's Karolinska Institute, awarding the 400,000 dollar prize, said their work had laid the groundwork vital in developing medicines against a variety of disorders, including leukaemia, malaria, virus infections and gout.

The citation said that work in the late 1940s by Elion and Hitchings, of the Wellcome Laboratories in North Carolina, plotted the differences between healthy human cells and cancerous organisms.

"Their original research... could be utilised to develop drugs that selectively block the growth of cancer cells and of noxious organisms," the institute said.

The most recent application of their work was the development at Wellcome of the drug Azidothymidine (AZT); the most successful drug so far developed to treat the symptoms

of AIDS, which kills by breaking down the body's immune system.

They developed the first effective drug against a virus, herpes, Professor Erling Norrby, of Karolinska's Nobel committee, told a news conference.

"Their principles were a condition for the development of AZT," he said.

In 1977, Elion (70) and Hitchings (83) produced acyclovir, which inhibited the growth of the herpes virus.

Fellow-researchers at Wellcome built on this breakthrough to produce AZT, which has proved effective at slowing the progress of the AIDS virus.

Black (64) of King's College Hospital in London, pioneered the development of beta-blockers — drugs used to ease the workload of the heart by reducing the oxygen supply, the institute said.

In 1962 his team developed the first clinically-useful beta-blocker, pronethalol, following it in 1964 with propranolol in 1964 which is used to treat angina and myocardial infarction.

"Black was the first to realise that the development of a clinically useful beta-receptor blocking drug might introduce a new pharmacotherapeutic

principle in the treatment of coronary heart disease," the institute said.

RAMU DEORA RE-ELECTED

Mr. Ramu Deora has been re-elected, chairman of the Basic Chemicals, Pharmaceuticals and Cosmetics Export Promotion Council (Chemexcil) at the annual general meeting held in Bombay on Oct. 15th.

Mr. J. B. Mody and Mr. G. D. Kelkar were elected Vice-Chairmen.

The following are the new chiefs of various Chemexcil panels: Mr. P. Patel (drugs and pharmaceuticals), Mr. S. C. Khativala (dyestuffs), Mr. S. R. Shroff (chemicals), Mr. S. S. Joshi (cosmetics) and Mr. G. Luthria (agribattis). Mr. Udeshi will represent merchant exporters.

Mrs. Simone Tata, chairperson and Managing Director of Lakme Ltd., has been elected as chairperson of panel IV (soaps, detergents and cosmetics).

The new year promises to add several new products to the council's export list, breaking new grounds for India on the world chemical industry scene. These include linear alkyl benzene (LAB) (a regular import item till last year), phenol, acetone and caustic soda.

ACN PROJECT: RIL SEEKS CLEARANCE

Reliance Industries Ltd. (RIL) has sought MRTPC clearance for setting up a 70,000 TPA project to manufacture acrylonitrile at Hazira, Gujarat.

Acrylonitrile (ACN), produced from propylene, is a raw material for a host of chemicals and pharmaceutical intermediates. Indian Petrochemicals Corporation Ltd. is the only indigenous producer, with a capacity of 24,000 tonnes. JK Synthetics has also applied to the Government for setting up an ACN project in Uttar Pradesh.

Reliance has also applied for an 80,000 TPA project to manufacture styrene butadiene rubber (SBR) costing Rs. 153 crores. At present, Synthetics and Chemicals Ltd. of Kilachand group is the only producer of this synthetic rubber. The public sector, Rashtriya Chemicals and Fertilisers Ltd. (RCF), also plans to produce SBR.

At present, some 10,000 tonnes are imported annually to supplement IPCL's production. The report of the committee for perspective planning for petrochemical industry has projected that demand for this chemical would rise to 73,000 tonnes by 1990.



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Political appointees in public sector

Politicians are now being nominated on the boards of public sector enterprises setting aside the well-established practice of inducting only well known professionals from various fields.

A beginning has been made in Indian Petrochemicals Corporation Ltd. (IPCL) one of the most well-managed enterprises in public sector. Mr. Dharandas Shastri, former MP and Ms. Anwara Taimur, president, All-India Mahila Congress Samiti, have been appointed following instructions from the highest quarter.

The industry ministry had recommended for nomination on the IPCL board, Dr. Mashelkar, a well-known scientist and Dr. Kirit Parikh, an economist, but both these names were rejected by the Prime Minister's secretariat. This move has shocked and surprised several chief executives in the public sector enterprises.

Inquiries revealed that the political appointees instead of giving broad

policy directions at the board meetings are actually interfering in the day-to-day functioning of the organisation. This is already being witnessed in the IPCL. Polymers command high premium in the market because of acute shortage.

The IPCL is one of the top ten profit-making companies of the country. The IPCL bonds are quoted high in the market and it was awarded the highest rating — triple A — for its creditworthiness.

The IPCL's financial strength and internal resource generation are such that it will have to embark on a major expansion and diversification programme soon. As the former chairman of the IPCL Dr. S. Ganguly, had observed the IPCL would be in a position to plan an investment of Rs. 1,000 crores every three years.

The IPCL's turnover which was Rs. 880 crores last year, is expected to touch Rs. 1,000 crores this year. This Maharashtra Gas Cracker, according to

the department of chemicals and petrochemicals is progressing well. Recently the IPCL won an award for safety and hazard management. The IPCL also claims to have developed technology to make PTA from DMT. Besides, it has been asked to put up a project for carbon fibre vaccines — both in frontier technology.

Recently Mr. H. K. Khan, secretary, department of chemicals and petrochemicals, announced that the IPCL will promote export of petrochemical-based products. Only in plastics, the potential is to export Rs 400 crores worth of products.

The question now being asked is whether the IPCL, which has earned a name in professionalism, will be able to retain its elan and independence with active politicians on its board. The company has no top executive since Dr. Ganguly was unceremoniously eased out. Apparently the practice of consulting the chairman in appointment of part-time directors has been given up in this case.

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INDUSTRIAL SUBSIDY : TWO OPTIONS BEING STUDIED

The Union government is working on two possibilities with regard to industrial subsidy under the central incentive scheme. The scheme expired last month.

While one proposal relates to its extension till March 1990. The other is for the total revamping of the scheme.

The government had even thought of winding up the scheme since the amount involved has been gradually increasing. As against Rs. 101.27 crores in 1985-86, it soared to Rs. 125.12 crores in 1987-88. During 1987-88 it touched Rs. 154.35 crores. During the last financial year it is learnt, that it had already crossed the Rs. 160 crore mark.

But the feeling is that in view of the forthcoming general elections, it may not be wise to wind up the scheme. Accordingly, the proposal for extending it up to March 1990 has been made. The other proposal, however, calls for major changes in the existing policy.

To begin with, the second proposal favours a slashing of the subsidy from the existing 25 per cent to 15 per cent for units in no industry districts and special regions. These are termed category 'A' units. Even the 15 per cent subsidy, now being mooted, pertains to units located in the remotest parts of a state. The backward areas, incidentally, were earlier categorised for graded subsidy, under three heads: Category A — (25 per cent subsidy subject to a ceiling of Rs. 25 lakhs — enhanced to Rs. 50 lakhs in the case of electronic industries in hilly districts with effect from April 1, 1985); Category B — (former central investment subsidy districts minus category A (15 per cent subsidy subject to a maximum of Rs. 15 lakhs); Category C — former concessional finance districts minus category A and B (ten per cent subsidy subject to a maximum of Rs. ten lakhs — with MR-TP and FERA companies not being eligible).

The proposal now is to abolish categories B and C. In fact, it is suggested that even for the north eastern sector instead of giving a general subsidy, the government should give full transport subsidy. Meanwhile, the industry ministry is submitting a proposal to the Cabinet for allocating growth centres to various states as also the criteria for setting up such centres.

Likewise, the Cabinet will consider the different financing patterns for the states where the growth centres are to come up.

The central investment subsidy scheme, as originally announced in 1971, provided for an outright subsidy at the rate of ten per cent subject to a maximum of Rs. five lakhs on fixed capital investment — land, building, plant and machinery.

From March 1973, it was enhanced to 15 per cent subject to a maximum of Rs. 15 lakhs. It was further raised to 20 per cent subject to a ceiling of Rs. 20 lakhs from March 1, 1981, for north eastern region and Sikkim. The incentives provided under the central subsidy scheme have helped entrepreneurs to set up industries in backward districts and areas.

ENVIRONMENT ACT SAID TO BE ANTI-INDUSTRY

Recent amendments to the Environmental Protection Act and the Factories

Act are highly biased against the entrepreneurs, virtually making it impossible for any chemical unit to function.

The responsibility for safety and environment should also be shared by regulatory agencies and local authorities along with the "occupiers" of factory premises. This was the consensus at a seminar on "Safety and environment management — challenges in prospect", organised by the Council of Industrial Safety.

Speakers pointed out that regulations were imposed on industrial units without providing the necessary guidelines for carrying out the statutory disaster management plan, risk analysis and so on.

For example, people in the vicinity of an industrial unit have "the right to know" about the products, processes and safety aspects. However, terms like vicinity (it may be 1 km, 5 km or 10 km) the manner of dissemination of information, the capacity of the people to understand the message and such issues remain unanswered.

While a green belt should be provided around the factory site, there was no guarantee that the belt would remain green or that there would be no encroachment. Local authorities and

government agencies should be made personally accountable for ensuring that no habitations were allowed near hazardous units, it was pointed out:

In respect of old factories, it would be difficult to retrofit the systems prescribed under the new legislation and some grace period should be allowed for them to meet the requirements speakers said.

As the stringent statutory controls might hamper industrial growth and since implementation of the new regulations posed fresh challenges, voluntary organisations should play an active role in helping the industries, according to a spokesman for the Council of Industrial Safety, which is the Maharashtra state branch of the National Safety Council.

Mr. H. Krishnamurthy, chairman and managing director of Hindustan Organic Chemicals, who inaugurated the seminar, said the hazardous industries could not be abandoned because of the problems posed by them. Instead, steps should be taken to control hazardous processes from affecting the health of the public. Safety, pollution control and industrial hygiene were the three main aspects in controlling such hazards, he opined.



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Indian rocket fuel oxidiser for Canadian Co.

In an ironic reversal of policy position, a Canada-based aerospace firm has placed orders with India for the purchase of the highly strategic chemical ammonium perchloride, banned for export to the developing countries by a cartel of Western nations.

Informal clearance has been obtained from the Government of India for the export of the material and an initial consignment of seven tonnes worth nearly 50,000 Canadian dollars is to be sent this month. The shipment will be made in special moisture-proof 40-kg packages.

India is one of the few manufacturers of ammonium perchloride which is an essential ingredient of solid rocket fuels as an oxidiser, used in satellite launchers, and sounding rockets for meteorological observations. A cartel of seven advanced nations led by the US and including Canada, had put curbs on the sale of the material to developing countries along with a host of other aerospace products and technologies for "checking proliferation of ballistic missile capability." While the cartel has stated that the curbs were not directed against any particular nation, it was generally understood that they were meant to slow down work in emerging space programmes of countries like India and Brazil.

According to indications available, the Canadians may sign orders for the purchase of 40 tonnes more of the material in the near future. The chemical is currently undergoing tests for determining its suitability for meeting long-term requirements.

The Canadian firm, which is a major supplier of sounding rockets to the US National Aeronautics and Space Administration (NASA), has been forced to hunt for new supply sources for the oxidiser after a major mishap at the ammonium perchloride plant of the US company, Pacific Engineering. A series of accidents in July this year at the Nevada-based plant of the company cut off half the source of supplies of the chemical to the US and Canadian rocket booster firms. Pacific Engineering along with Kerr McGee, another US company, are the major suppliers of the product worldwide.

In India, manufacturing capability for producing solid rocket fuel-grade

ammonium perchloride has been developed entirely by the Indian Space Research Organisation (ISRO). Apart from ISRO, itself, the other major producer of the chemical within the country is the private sector Wimco which also supplies the material for the rocket launching and sounding rockets programme. At present, the ISRO plant at Alwaye, Kerala and the Wimco plant in Tamil Nadu put together have a combined annual capacity of 450 tonnes.

GREENHOUSE EFFECT MAY BENEFIT INDIA?

India and Africa will be the largest gainers and the United States the biggest loser as environmental pollution brings about major climatic changes in the world, the president of the Bombay-based Global Futures network, Dr. Rashmi Mayur, said recently.

Dr. Mayur said the climatic changes, called the Greenhouse effect, would result in the blooming of the Thar and Sahara deserts even as huge areas of farm land in the US went waste.

He, however, stressed that even with this benefit, India, in the event of a global warmup, would still suffer along with other nations with a coastline as melting polar ice caused the sea level to rise and vast area were inundated as a result.

India, Dr. Mayur said, had other environmental problems which it had to tackle in addition to the pressing population problem which it could not ignore.

"With a caveat that nobody really knows how serious the Greenhouse effect problem really is, if the pessimists are right, when the sea level rises up to 40 kms along the coast will be under water. Fifty per cent of Bombay and one-third of Bangladesh will be under water," he said.

In a paper he presented, Dr. Mayur, keeping countries like India in mind, proposed that energy efficiency be given high priority. This, he said, not only cut pollution but also saved money.

Dr. Mayur also called for the utilisation of alternative energy, such as solar and biomass energy, which he said, could supply 40 per cent of the energy in India's villages.

He also said if kerosene was made available at subsidised prices with a fee levied on petrol, the villagers would not have to depend on firewood.

Dr. Mayur said India and other Third World nations would have to plant five million hectares of forests a year to make up for the depredations caused by deforestation. At present India was losing 1.6 million hectares of forests every year, and only 13 per cent of the country was covered by forests, he said.

By the end of the century, at the present rate, there would be only four or five per cent forest cover, with disastrous consequences to the country, he warned.

He blamed the developed countries for 78 per cent of the world's pollution and called for worldwide education on environmental problems at the grass-roots and policy-making levels.

IPCL PRICE HIKE FLAYED

The recent hike in the price of plastic raw materials by Indian Petrochemicals Corporation Ltd. (IPCL) has drawn flak from the All India Plastic Industries Association.

In a telegram sent to the Prime Minister, Mr. Rajiv Gandhi, the Association has called for his immediate intervention as so as to persuade IPCL to give up the "pool price policy" and restore normal trade imports of LDPE and healthy open competitive conditions under the changed OGL policy.

The Association has pointed out that the Prime Minister had stated in his budget speech of 1987-88 that "plastics are widely used by the common man. They also have tremendous potential for use in farms and factories. Our plastics prices are high. Government propose to initiate measures to reduce cost in this important area."

The Association has in this regard stated that the above assurance had raised high hopes among the plastic manufacturers and dealers but steady increase in the prices of plastic raw materials have belied them. IPCL has even misled Parliament in this regard, the Association has claimed.

Brand rate scheme for duty drawback

The Government has introduced a simplified brand rate fixation scheme for duty drawback on exports dispensing with the requirement of official preverification of data for selective class of manufacturer-exporters of particular industries.

The scheme will be applicable to established manufacturing concerns who have regular production of the export product and a detailed accounting system.

To start with, the scheme will be applicable to exports of engineering goods, electronic items and chemicals, according to an official press release.

Certain measures to safeguard against the abuse of the new facility like furnishing of an indemnity bond and post-factor checking of the data furnished, have also been built into the new scheme.

In the new scheme, the brand rates will be based essentially on the data and documents as furnished by the manufacturer-exporters duly checked and certified for their authenticity by independent chartered engineers, cost accountant or chartered accountants.

This is expected to facilitate quicker drawback disbursement to established manufacturer-exporters and encourage the export effort by cutting down delays inherent in the present brand rate facility.

The present brand rate facility contemplates an application being filed by the individual exporter with appropriate documents indicating the consumption pattern of various inputs and duties paid thereon, their

pre-verification by the Department of Revenue and subsequent rate fixation in the Finance Ministry. on the basis of which the exporter gets his drawback payments from the concerned customs house.

Announcing the new simplified scheme, the press release says that further measures for speeding up the departmental verification are also being taken.

According to the release, the application under the new scheme should be related to goods exported under a particular shipment.

However, as at present the exporter may make an application for the same goods for a period of time if it is certified that the consumption pattern would be the same for successive shipments and the exporter has sufficient stock of the related inputs at the time of making the application, for its manufacture.

The application must be submitted within the time limit as laid down in drawback rules i.e. not later than 30 days of the date of export of any goods, for which the brand rate is desired.

The applicant shall also furnish alongwith the application an indemnity bond bearing the proper stamps binding himself to pay up immediately the entire amount or such differential amount of drawback as may be required by the Government if the data on post-factor verification by the department is found incorrect in any respect requiring a withdrawal or change in the brand rate which may be issued on the basis of the data filed.

The Government would, unless there are any special reasons, normally fix the drawback rate taking into consideration the data filed, as duly certified by the applicant and chartered engineers, cost accountant, chartered accountant without pre-verification, and the exporter would be authorised to claim the drawback rate considered admissible from the concerned customs house.

The applicant availing himself of the new facility shall be required to keep the records ready for the post audit of the data, which would be got done through the concerned customs house or the Central Excise Collectorate with whom two copies of the application would have to be filed in the initial stages.

If the details and data furnished in the application are found incorrect on post checking by the department in any respect or there is suppression of any facts which may have a bearing on the brand rate fixed, the facility under the scheme shall stand withdrawn, forthwith and normal procedure for pre-checking and pre-verification will have to be followed.

The exporter will have to pay back immediately the excess amount of drawback drawn in terms of the indemnity bond apart from facing other penal actions that may be initiated against him for submission of false or incorrect data etc.

The existing provisions of brand rate on pre-verification would continue to apply, wherever any exporter, though eligible, does not seek the new facility or to industries or class of exporters to which this facility is not extended.

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AIMO task force for small entrepreneurs

The All-India Manufacturers Association (AIMO) has decided to form a cell to supply information and a task force to help small entrepreneurs right from initial stages of starting an industry.

This was announced by Mr. R.M. Dujodwala, President, AIMO, at a function held in Bombay on October 11, to felicitate him on his appointment.

Addressing newsmen, Mr. Dujodwala said AIMO was firmly committed to the development of industry consisting of small, medium and large sectors.

As regards sickness of industry, he felt, AIMO could take up a few specific industries where sickness was acute to identify the causes of sickness and endeavour to secure remedial measures from both the Union and State Governments. Sickness is more pronounced in Maharashtra and, therefore, AIMO would give special attention to the problem in this State.

Mr. Dujodwala saw good scope for small units in Maharashtra, particularly in high tech area of electronics. With a large number of technically qualified people available in the State, electronics and computer software units should boom.

AIMO would also explore the possibilities of setting up joint ventures in Mauritius. AIMO delegation was scheduled to visit Mauritius to identify areas of interest to Indian industries. The Union Finance Minister, Mr. S. B. Chavan, had invited

AIMO panel to discuss-economic matters and a memorandum for this purpose was being drafted by AIMO, he added.

MP ANNOUNCES NEW INDUSTRIAL POLICY

The Madhya Pradesh Government has announced its new industrial policy which will focus on the promotion of high technology industries, besides food processing, electronics, telecommunications and petrochemicals, ensuring proper exploitation of the State's rich natural resources.

The Chief Minister, Mr. Arjun Singh said the new policy would accelerate the industrial development which was not up to the desired level and benefit mainly the small farmers.

Industrialists in the country and non-resident Indians (NRIs) would now find a favourable industrial climate in the State where more relations and incentives would be given under the new policy, he said.

The Industries Minister, Mr. Chandra Prabhash Shekhar, presented the details of the new policy and the action plan which envisages formation of an industrial infrastructure development corporation, setting up of a trade centre, a "dry port" and a State-level trade fair authority.

Mr. Shekhar said the new policy would grant more benefits to the women entrepreneurs, speed up the growth of medium and large industries with better facilities for the

supply of raw material known-how and marketing facilities. Sales tax rates would be made more attractive for the "thrust sector," industries and special task forces would be set up to promote food processing units.

The State Government has also decided to revise the power tariff to three paise per unit for the units using upto 150 HP and allow more concessions under the Urban Land Ceiling Act.

GEB SEEKS GAS FOR POWER GENERATION

Coal India has expressed its inability to supply additional coal to power stations of Gujarat in the next five years. The Railways have also refused to carry additional quantity of coal during the same period.

Mr. Jasvant Mehta, Chairman of the Gujarat Electricity Board (GEB), has represented to the Centre to provide natural gas for power generation to avoid an energy crisis in the State.

Mr. Mehta has also advocated green signal to the Gandhar gas power station as early as possible. He says that the supply of gas to Gujarat has been delayed while the Union Government has set a pipeline at a cost of Rs. 1,500 crores to carry gas to Jadishpur with a view to providing gas to the fertiliser project. As the fertiliser project at Jadishpur is likely to be delayed, the Centre is now planning to supply gas to the Dadri power project near Delhi.

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IOC prepares 12-yr. plan

Indian Oil Corporation (IOC) has finalised a perspective plan till 2000 AD identifying projects to be undertaken by that time in different regions of the country. The total investment envisaged for these projects is estimated at Rs. 5,000 crores.

If the current situation is any indication, says a spokesman of IOC, almost the entire amount is likely to be raised from within the company. "After all, we are number one in turnover and number two as profit earner among all state-owned undertakings", he said adding, "if the situation so warrants and the government permits, we might explore alternative sources for raising revenue like inviting deposits from public or going for market borrowing".

The thrust of the perspective plan, the spokesman explained, is directed towards maintaining the market share at the present level of around 58 per cent and the share of the refining capacity at the current level of 45 per cent unchanged even by the turn of the century.

"Maintaining the market share at the present level even after 12 years from now is itself a big job particularly when the consumption of petroleum products is rising at an average rate of three million tonnes annually", he added.

The consumption figure by the turn of the century is estimated to touch the 100 million tonne-mark against the present level of less than 50 million tonnes.

The total consumption of petroleum products in the country in 1987-88 was 46 million tonnes which in 1988-89 is estimated to go up to 49 million tonnes. The demand for middle distillates (kerosene, aviation and diesel fuel), it is estimated, will continue to grow at a faster pace than other petroleum products. Between 1970-71 and 1987-88, the demand for middle distillates, as a percentage of the total oil demand in India, has gone up from 50.5 per cent to 60.5 per cent. This is likely to increase to 63 per cent in 1995-96 and 66 per cent by the turn of the century.

Of the middle distillates, high speed diesel (HSD) is expected to grow at a faster rate of around eight per cent to reach the consumption figure of 30 million tonnes by

of HSD by 1994-95 is expected to be around 18-20 million tonnes, leaving a gap of about 10-12 million tonnes. About 60 per cent of HSD consumption is to be accounted for by the transport sector and 17-18 per cent by agriculture.

Therefore, the management of the gap between demand and indigenous availability of HSD and meeting the growing needs of the transport and agriculture sectors will be, in

Kandla-Bhatinda pipeline soon

The Indian Oil Corporation (IOC) has proposed to lay a World Bank-aided finished product pipeline from Kandla to Bhatinda in Punjab at a cost of Rs. 650 crores.

This was disclosed by Mr. M. K. Jain, General Manager (Western Region) of the Corporation. He said that the proposal has been submitted to the Union Government and the final clearance awaited.

The pipeline will pass through Sidhpur in north Gujarat where IOC has decided to construct a new terminal with tankage and other facilities. The pipeline will have a capacity to transport three million tonnes of finished products like kerosene, high-speed diesel oil and petrol. The construction of the pipeline will be completed within three years after getting permission from the Centre.

Mr. Jain explained that the consumption of oil is increasing in the north-west region and the Railways may not be able to cope up with the demand. Therefore it is necessary to have such a pipeline.

Mr. Jain said the production capacity of the Gujarat refinery will be increased from the present level of seven million tonnes to nine million tonnes per annum. The demand for petroleum products in Gujarat during 1987-88 was 5.19 million tonnes. IOC has the distinction of meeting 76.3 per cent of the market requirement.

Gujarat has the largest refinery in India at Koyali near Vadodara, the largest port terminal tankage at Kandla and also one of the largest inland pipeline terminals at Sabarmati. These supply sources are geographically well positioned to effectively meet the full requirement of Gujarat.

Indian Oil, he observed, recently

the opinion of the IOC spokesman among the major challenges facing the government and the oil companies.

However, the most important challenge will be to meet the domestic fuel requirement of a growing nation. According to IOC's estimate, the demand for LPG alone will rise to 4.5 million tonnes by 2000 AD from the present level of about 2.5 million tonnes. And to cater to such huge requirements, the distribution network too has to be strengthened.

constructed a new depot at Rajkot with a storage capacity of 36,000 kls. It is proposed to construct another depot at Surat with a storage capacity of 30,000 kls. At the Kandla terminal, it has plans to add 2.24 lakh kls. to meet the ever-growing requirement of petroleum products.

NAPHTHA PRICES CRASH

Naphtha price has crashed to \$ 100 a tonne in the wake of fall in crude prices in the international market. Naphtha was ruling at \$ 130-134 a tonne f.o.b. as recently as August.

Ironically, this has happened at a time when the modalities of supply of naphtha and benzene to exporters at global prices are being worked out. If the lower naphtha prices translates into cheaper petrochemicals, it may pave way for tougher competition in the market place, it is feared.

At a meeting in New Delhi recently "international price" in the case of naphtha was defined as the f.o.b. realisation on naphtha exports during the preceding quarter. In the case of benzene (of which Indian Oil Corporation is the canalising agent for imports), international prices plus storage charges are quoted around \$ 333 f.o.b.

The scheme for supply of benzene and naphtha derivatives to exporters at global prices is expected to prove a shot in the arm of exporters, judging by the enquiries received by oil companies.

Input-output norms for naphtha derivatives have already been announced. Norms for three naphtha derivatives (ethylene, ethylene oxide and ethylene glycol) are expected to be announced shortly. The list may be expanded to include more products on a future date.

HALDIA REFINERY EXPANSION

IOC seeks IBRD aid

Indian Oil Corporation (IOC) has sought World Bank assistance for part financing the proposed Rs. 40-crore lube expansion of Haldia refinery. Mr. S.L. Khosla, chairman, IOC, said the \$ 250 million package currently being discussed with the World Bank would also partly cover the cost of laying the 1,300-km long Kandla-Bhatinda pipeline estimated at Rs. 650 crores and the Rs. 140-crore reformer projects for Barauni and Digboi refineries.

The capacity of the Haldia refinery is now being raised by 26,000 tonnes to 176,000 tonnes at a cost of Rs. 20 crores, to be met entirely from within. The World Bank assistance has been sought for further increasing the capacity by 60,000 tonnes to 236,000 tonnes per annum. "We will go ahead with the second phase expansion even if World Bank funds are not available," said Mr. Khosla.

The World Bank appraisal team is expected by the end of this month and a clear picture about the finan-

cing of new projects will emerge early next year.

Asked if IOC had abandoned the earlier proposal for doubling the capacity of the Haldia refinery from 2.5 million to five million tonnes, he replied that the cost of expansion today being as high as that of setting up a greenfield project the current thinking was in favour of new refineries. Various locations in Uttar Pradesh, Orissa and West Bengal (including Haldia) are being examined.

However, IOC proposes to invest an additional Rs. 40 crores for creating facilities for handling about 240,000 tonnes annually of imported LPG at Haldia. Hazira is also being considered for the same purpose. This was because, the chairman explained, LPG imports in next few years were likely to shoot up to 0.5 million tonnes from the present 280,000 tonnes and the port facilities available at present were inadequate. At present, LPG is imported at two ports, namely, Bombay and Vizag.

"But there are some bottlenecks at the Vizag port and we would like to go slow over there," observed Mr. Khosla.

Mr. B.K. Bakshi, director (marketing), said IOC would spend over Rs. 200 crores in next few years to create additional storage facilities for petroleum products throughout the country, "The amount will be raised entirely from within," he said. "After all, resource-wise we are in a comfortable position."

The essence of the storage scheme, Mr. Bakshi explained, was to have a stable 30 days' cover at the 1994-95 throughput level estimated at 74 million tonnes. "Every year the consumption is increasing by an additional three million tonnes", he said adding that even in the best of situations, the coverage available was less than 30 days. This often created problems. For example, IOC found it hard to maintain supplies to remote areas like Ladakh, or even the north-east region, Andamans and Nicobar or Lakshadweep islands particularly when the weather condition was not normal. "And in this country, there is no dearth of such abnormal situations", he observed.



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Dollar 140 m IBRD credit for OIL

The World Bank has sanctioned a loan of US \$ 140 million to Oil India Ltd. (OIL), to help finance its several projects to be carried out in the next seven years.

The loan was finalised after the World Bank team had detailed discussions with OIL and various other government agencies.

OIL will draw approximately US \$ 14 million towards implementation of its various schemes during the current year. The balance will be spread over the next six years.

The projects sought to be completed with the finance provided by World Bank are: (1) Production improvement scheme in Assam which covers (A) infill drilling in Nahorkatiya and Moran, (B) workover of sick wells, (C) pressure maintenance and EOR pilot projects, (D) well stimulation including hydraulic fracturing.

(2) Gas development and associated gas supply network.

(3) Exploration comprising of (A) drilling of four exploratory wells in Kumachai, (B) 10,000 line kms. of seismic survey and drilling of six exploratory wells in Rajasthan and

(4) Institution building comprising of (A) training and purchase of training aids and (B) purchase of latest equipments for exploration and R and D.

The loan has become effective from September 29, last year.

As regards the drilling of infill wells and implementation of the EOR pilot projects, OIL is obtaining the consultancy services to get detailed reservoir engineering studies. Meanwhile stimulation by acidisation/hydraulic fracturing is under progress. The workover of sick wells is a continuous activity and it is reported to be proceeding as per the plans.

The implementation of gas development and associated gas supply network project would start after acquisition of gas compressors, under three phases. The delivery of gas compressors under Phase I is expected to start from January 1989.

In Kumachai, the exploration of two wells has already been completed and a number of oil and gas

have already tested oil production of 40 kldp and 60 kldp. The detailed production testing is under pro-

GCC ready to hike production ceiling

Saudi Arabia and its partners in the six-nation Gulf Co-operation Council are ready to raise OPEC's overall production ceiling to try to stabilise prices.

The move, outlined in a statement released following the GCC Oil Minister's meeting appeared to defer to neighbouring Iraq in giving it approximately the same quota as Iran.

Emerging from an eight-year war, both Iran and Iraq have said they will need to pump as much oil as they deem necessary to finance post-war reconstruction projects.

GCC had one basic condition for the higher ceiling: Adherence by all members of the Organisation of Petroleum Exporting Countries to any production levels agreed upon. The Ministers also called for co-operation by oil producers outside the cartel.

The Ministers of Saudi Arabia, Kuwait, Qatar, Bahrain, Oman and the United Arab Emirates called the meeting to try to forge a joint strategy to help OPEC prop up oil prices, slumping because of a market glut.

The statement, carried by the official Saudi press agency, said the GCC states "affirmed their quest to stabilise the world oil market on condition that this be the position of the other oil producers inside and outside OPEC."

The statement said the GCC states were ready to follow an overall production ceiling of 17.429 million barrels per day for the 13 members "or any higher ceiling upon which agreement is reached within the organisation."

The United Arab Emirates and Norway called for co-operation between OPEC and non-OPEC states to help boost world oil prices, officials from both countries said.

"Such co-operation will positively affect oil prices and achieve stability in the oil market," the UAE's Oil Minister, Mr. Mana Saeed Otai-ba, said. His comment was carried by the official Emirates news agency WAM.

Mr. Otai-ba met with Norway's non-resident Ambassador to UAE,

gress. As regards Rajasthan, gas has been discovered in commercial quantities at the first exploratory well at Tanot. The well produced 45000 cu. metres of gas per day through six mm beam.

importance of arresting the price slide through co-operation between OPEC and non-OPEC producers," WAM reported.

World oil price fell as low as \$ 12.30 per barrel due to over production by some OPEC members. But prices later jumped ahead of the OPEC Ministerial meeting in Madrid.

Norway, an important non-OPEC producer has threatened to lift self-imposed output curbs unless OPEC acts to restrain production and stabilise world prices.

In Muscat, Oman's Minister of Petroleum and Minerals, Mr. Said Bin Ahmad Al-Shanfari, said his country would co-operate with all oil-producing states to half the drop in prices.

"The Sultanate (of Oman) has always co-operated with all producing countries and will continue to do so to check falling oil prices", he told the Daily Oman in an interview published recently.

Oman, along with Bahrain—both non-OPEC members—have voluntarily reduced their oil exports, estimated at 550,000 barrels per day to maintain the \$ 18 benchmark price set by OPEC.

DEVELOPMENT IN SUPER CONDUCTIVITY

The existing allocation of funds for the National Superconductivity Programme during 1988-89 is Rs. 11 crores, with the following break-up.

- i. Department of Atomic Energy Institutes Rs. 3 crores.
- ii. Council of Scientific & Industrial Research (CSIR) Institutes Rs. 3 crores.
- iii. Department of Science & Technology supported programmes in other institutes & industry Rs. 5 crores.

28 institutions and organisations,

Ministerial panel to plan gas-based power projects

As production of natural gas is expected to move up by more than 130 per cent to 120.74 million cubic metres by the end of the Eighth Plan over the corresponding figure for the Seventh Plan the Union Government has set up an inter-Ministerial group to plan gas-based power projects tied to fields at Gandhar, Tripura, Assam and Krishna-Godavari with an aggregate capacity ranging between 5000 mw to 6000 mw.

The Government has also asked National Thermal Power Corporation (NTPC) to prepare feasibility reports for 1200-1500 mw power capacity addition along HBJ pipeline. NTPC is already busy putting up three gas-based power projects at Kawas (Gujarat), Anta (Rajasthan) and Auraiya (Uttar Pradesh) with capacity totalling 1500 mw along the HBJ pipeline.

In addition NTPC is also setting up a 500 mw gas-based power plant at Tripura. The Assam State Electricity Board (ASEB) has submitted feasibility report for 360 mw capacity.

Thanks to the sustained exploratory efforts by Oil and Natural Gas Commission (ONGC), huge reserves of gas have been discovered in A.P., Tripura, Gujarat, Assam and Bombay offshore. Encouraging results have also been obtained in Rajasthan and Tamil Nadu. To put the gas to proper use, ONGC has started identifying the potential customers.

In Tripura, a host of industries engaged in manufacturing cement, brick kilns and methanol have shown keen interest in use of gas. At least nine agro-based industries and State Electricity Board have been committed about six lakh cubic metres of gas in Andhra Pradesh. Gas supply to the extent of 15000 lakh cubic metres has also been committed to three industrial consumers in Tamil Nadu from the Cauvery basin.

The western region, where a fairly well developed gas grid has been developed particularly in the north and south Gujarat area, is supplying gas to major fertiliser complexes, power plants, textile units, chemical industries, pharmaceutical units, dairy and a host of other industries. Gas commitment to the fertiliser and other industrial units has been enhanced after the availability of sub-

stantial quantities of gas from Gandhar.

In the eastern region, the gas utilisation has increased from 12 per cent in 1980-81 to 80 per cent recently, due to increase in the uptake of gas particularly by the power plants of the Assam State Electricity Board (ASEB).

Gas for domestic purposes has been committed to be supplied to the Bombay city, Ankleshwar, Bharuch and Surat towns of south Gujarat, Nazira in Assam and Agartala in Tripura. The total gas committed for these towns and cities is around 1.76 million cubic metres per day. Gas supply to Sibsagar in Assam has already started. The Baroda Municipal Corporation is also receiving gas at the rate of 67,000 cubic metres per day.

The Giant Bassein offshore gas field, has been recently put on production. The field is being tapped to supply gas to the fertiliser, power, petrochemicals and other industries enroute the HBJ pipeline.

To reach the gas from the fields to the consumption centres, an impressive network of pipelines is being laid. In offshore, a vast network of pipeline is presently supplying gas from western offshore to ONGC's two processing units at Uran and Hazira. An alternate reliable transportation system is under consideration for supplying gas from the recent discoveries like Panna, R-series, B-57 and D-18 and other fields in western offshore. The Heera-Uran Trunk pipeline under implementation would connect the Heera, R-series and Neelam fields and other isolated fields to Uran.

In the gas-rich Krishna-Godavari onland, a 72 kms. pipeline has been completed in the West Godavari district of Andhra Pradesh connecting Narsapur to Kovvur. Incidentally, this is the first major gas pipeline in the Southern India. The pipeline has a capacity to transport six million cubic metres of gas per day.

In Krishna-Godavari gas has been struck onshore of Razole, Bhimnapalli, Kaza, Narsapur, Tatipaka, and Mandapetta. Plans are afoot to connect these gas bearing structures to supply about three million cubic metres of gas per day by 1989-90. In the offshore, an interesting breakthrough has been achieved at GS-16 (Ravva) structure. Plans

are also being drawn to connect the onshore and offshore gas producing structures.

The total production of gas by the end of the Eighth Plan (1994-95) from the basin is expected to be 5.99 million cubic metres. An 18 km. pipeline has also been completed in the Thanjavur district of Tamil Nadu to supply gas from the wells at Narimanam.

In remote Nagaland, ONGC has agreed to supply 20,000 cubic metres of gas per day to Nagaland Pulp and Paper Company Ltd. at Tuli for which the work of laying 14 kms. pipeline is in progress.

ONGC EFFORTS TO RAISE OUTPUT

The Oil and Natural Gas Commission (ONGC) is giving special thrust to workover operations to enhance output from the wells.

As a result, the workover index has gone up to 10.16 within a short time from 4.58.

The achievement assumes significance as the number of producing wells has gone up from 1,822 in 1980-81 to over 3,000 at present.

ONGC is currently implementing nine enhanced oil recovery (EOR) pilots. The work involves very simple to most complex technologies like gas injection, in-situ combustion, polymer flood, steam flood etc. Three projects have already been commissioned.

According to ONGC sources, the aggressive exploration and innovative exploitation strategy adopted by it will lead to an 80 per cent cumulative increase in output of oil and oil equivalent of gas comprising 60 per cent increase in crude and 20 per cent in natural gas during the Seventh Plan as compared to the Sixth Plan.

A total of 75 discoveries of oil and gas have been made since the beginning of the Sixth Plan. With a view to accelerating the process of early assessment of reserves and exploitation of potent new discoveries, the concept of early production system has been introduced.

The strategy has helped in generating additional reserves to the extent of Rs. 74 crores per annum. So far, 30 discoveries have been put on production, according to Commission sources.

By drilling two horizontal wells in Bombay High, the Commission has joined the select group of international companies possessing the specialised technology.

Indigenous production of crude economical

Even if the exceptionally low level to which oil prices in the international markets have plummeted linger for some time, it would be economical for India to step up its efforts for the production of oil, according to experts in the oil industry. With the infrastructure and knowhow that India has already built up, it would be worthwhile to increase indigenous output as the cost of production in this country is lower than in most other oil producing countries barring West Asia.

By the end of the Eighth Plan, the indigenous output of crude in India would mount to over 46 million tonnes a year from 31 million tonnes in the final year of the Seventh Plan. Experts think that the share of Bombay High crude in the overall output of oil would decline from about 76 per cent now to just over 30 per cent in 1995-96 as a result of new discoveries in other onshore and offshore fields.

Rise in reserves

An overview of the role of the ONGC in taking India closer to the goal of self-reliance in oil and oil products was given to members of the Forum of Financial Writers in New Delhi recently. Even though the Government equity in the ONGC remains unchanged at the level of Rs. 342.85 crores since 1981, the ONGC has generated massive resources to

intensify the exploration of oil reserves. As a result the hydrocarbon reserves have increased from 3.3 billion tonnes as of January 1, 1981, to 4.48 billion tonnes at the beginning of this year.

The ONGC trebled its crude oil output from 9.21 million tonnes at the beginning of the Sixth Plan to 27.91 million tonnes in 1987-88. Gas sales increased from 972.15 million cubic metres in 1980-81 to 5,874 million cubic metres in 1987-88. LPG production increased seven fold from 73,000 tonnes in 1981-82 to 509,800 tonnes six years later.

The performance of any oil company, according to experts, is judged by the quantity it adds to its already established stock of recoverable reserves vis-a-vis its quantum of production. In the last seven years the ONGC has established 375 million tonnes of recoverable oil, while its output during this period amounted to 181 million tonnes.

This was described as an impressive performance by any standard. The ONGC had in the fourth year of the Seventh Plan exceeded by 30 million tonnes the five-year target of adding 970 million tonnes of reserves. The pace of exploratory activities established during the Seventh Plan would be maintained in the Eighth Plan by an accretion of 1,222 million tonnes of reserves to the already existing reserve base.

Innovative strategies

The success achieved by the ONGC is attributed to a series of innovative strategies and initiatives taken by its management. The oil business is often referred to as input deterministic and output probabilistic. Preseverance and the ability to take calculated risks are the two essential ingredients to sustain growth in oil exploration. The ONGC has done both. The other management initiatives have been instrumental in fostering an environment which promotes productivity, inculcates an attitude of cost reduction at every level and a climate which nurtures innovators and achievers.

The ONGC maintains its lead in India's corporate world by registering a profit after tax of Rs. 1,507 crores in 1987-88. It has proved that given the right directions, public enterprises can perform excellently.

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Graphite Vicarb India Limited, A Nasik-based unit, has indigenously designed, manufactured and commissioned India's first fully automatic hydrochloric acid synthetic unit.

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COMPANY NOTES

BENGAL IMMUNITY TO COMMENCE CHLOROQUINE PHOSPHATE PRODUCTION SHORTLY

Bengal Immunity's chloroquine phosphate plant, which has been plagued by problems, is expected to commence commercial operations by the end of the year.

According to company sources, the management proposes to operate six guarantee runs next month to assess the technical efficiency of the plant, after which commercial production will start. An investment of Rs. 3.9 crores has been made in the project as against an original estimate of Rs. 2.5 crores, implying a cost overrun of around Rs. 1.5 crores so far.

According to the management, Krebs and CIE, the turnkey contractors, were not in a position to implement the project successfully as they were in financial difficulties. As such the management has now asked the contractors to act as consultants only. The management has recently reassessed the profitability of the product and expects that the margins would be substantially higher than estimated earlier. There is a shortage of chloroquine in the market and the product is being sold at a much higher price than stated. In fact, an official rise in the price of chloroquine from Rs. 542 per kg, is also expected. As such the project is expected to be viable.

The plant which has a capacity of 80 tonnes per annum, was set up by Krebs and CIE in 1985. However, company sources observe that because of

technical deficiencies, the plant never really functioned effectively. Though the turnkey contractors have been repeatedly asked to rectify the faults, snags develop frequently, they note. In fact, sources point out that till now even the trial runs have not really been very successful. However, of the 12 trial runs which have so far been completed, the management claims, that the last three batches have resulted in a production level of 80 per cent.

In the limited context of the last three batches, the performance, it points out, can be termed satisfactory though it admits that the trial runs should have actually resulted in a production level of 90 per cent. One reason put forward for the lower production level is the plant is not being run continuously. Only two shifts are being operated while normally three shifts should be run. Besides, the instrumentation control was not functioning properly and the contractors have been asked to set it right. In addition, the chloroquine plant has thus far been functioning without the demineralised water plant. The later is expected to be completed shortly.

EXCEL FARING WELL

Excel Industries has fared well during the 12 months ended September, 1988. Sales were expected to reach a record-high of Rs. 65 crores against Rs. 47 crores in the previous year. The pre-tax profit is expected to be record-high. According to Mr. D. S. Seth, chairman, export earnings of the company has in-

creased by nearly 75 per cent to Rs. 10.41 crores.

The company's accounting year will, this time, close on March 31, 1989. For the 18-month period ending March, 1989, it hopes to exceed sales of Rs. 100 crores. It will consider payment of second interim dividend towards the end of 1988.

Answering a query at the company's extraordinary general meeting in Bombay recently, Mr. Darbari Seth said that if the company continues to fare well if the monsoon is good next year, it may consider issue of bonus shares at the appropriate time.

M.J. PHARMA

M. J. Pharmaceuticals may come out with its maiden dividend during the current year ending March 1989 in view of the improved performance and encouraging trends, according to Mr. J.M. Shah, Chairman of the company.

Mr. Shah said that it has been able to achieve a turnover of Rs. 17.50 crores for the six-month period ended September 1988 which was a marked improvement on the turnover of corresponding period of last year. It expects to reach a turnover of Rs. 30 crores in 1988-89. It has also been able to earn a profit of Rs. 18 lakhs in the current year.

The outlook for 1988-89 appears to be promising, especially as the company's plant at Ankleshwar, for the manufacture of bulk drugs is fully operational. Substantial amount of ibuprofen manufactured at this plant, is being exported. The plant at Halol is now fully equipped to produce several new dosage forms.

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SPOTLIGHT ON

Biotechnology & Life Sciences (Part 2)

SEEDS -- A NATURAL ROUTE FOR BIOTECHNOLOGY

Seed breeders improve crop productivity through conventional plant breeding programmes. This is as much an art as a science, relying on the breeder's ability to identify traits in a plant that will improve yield and quality. These traits have to be obtained from specific germ plasm and evaluated for their genetic potential. Pure lines must be bred so that combination will produce the improved variety, which then has to be tested.

Before the advent of biotechnology this required growing the plants to maturity and anything between 8 to 10 years could be required to develop new hybrids. But there are two areas where biotechnology is having an impact on conventional breeding to identify traits from the genes found in any of the plant's cells and plant tissue culture is used by the breeder to regenerate a plant cell, tissue or organ to obtain the desired traits. Both these techniques make conventional breeding easier and speed up the breeding cycle.

While tissue culture and genetic finger printing already are conventional breeders, genetic engineering has yet to make an impact on the development of new seed varieties. In the medium term, single gene effects will be bred into plants, making them resistant to herbicides, insects, viruses, or fungi. But it will take much longer to achieve multi-gene effects that improve yield and quality. Most researchers in the field say that genetic engineering of recombinant DNA, or gene splicing, will become a standard tool for

breeders after the year 2000 A.D. Limited success has been reported so far with around 20 varieties, all of the dicotyledon type including tomato, oil seed rape, cotton and cabbage. Cereals (monocotyledons), which are more important economically, are resistant to current techniques.

In 1985, \$7 million worth of engineered seeds were planted worldwide, this is set to pass through the \$1.8 billion mark by 1995 and reach \$5.9 billion by the year 2000 A.D. according to William Teweles, an independent US seed consultant. Hybrid wheat accounted for \$750 million of US seed sales in 1987. (*ECN Fertilizers & Agrochemicals Supplement*, March 1988, p. 14).

A LATEST DICTIONARY OF MICROBIOLOGY & MOLECULAR BIOLOGY

The latest dictionary of microbiology and molecular biology by Wiley -- Interscience, Chichester 1987, UK -- provides a storehouse of up-to-date information on the subject.

The dictionary runs to 972 pages from A (Adentine) to Zythia (a genus of fungi). It may be the best dictionary on microbiology and molecular biology! The large amount of information is made readily accessible by the use of extensive cross-referencing, making the task of looking up entries relatively easy. In addition there are 10 pages of appendices, including a variety of metabolic pathways and a bibliography. Many entries include more information than is required merely for definition perhaps due to ambitious aim to encapsulate and integrate, in a single volume, a body of

knowledge covering the many and varied aspects of microbiology.

The dictionary will prove a valuable reference book to biochemists, microbiologists and biotech researchers. At a price of £69, it is an expensive investment for an individual but a welcome addition to any library. (*Dictionary of Microbiology & Molecular Biology* by Paul Singleton and Diana, Sainsbury, Wiley-Interscience Chichester (1987), U.K. pp 1099. Price £69).

A BIODEGRADABLE PLASTIC BAGS AND FILTERS BASED ON CORN STARCH AND POLYETHYLENE UNVEILED

American researchers are active to develop industrial applications of corn, the nation's largest and most important crop. They have learnt to believe that virtually anything that can be made from the molecular ribbons of carbon and hydrogen that form petroleum can be manufactured from corn starch, which consists of chains of carbon, hydrogen and oxygen.

These scientists have initially concentrated on the disposable packaging industry with a hybrid product that is part corn starch and part polyethylene. A disposable plastic bag was made public recently. Other potential applications being explored include a new generation of filters from corn starch particles based on the USDA's 'super slurper' (super absorbent) technology and a blend of polyethylene and corn starch to make plastic resins for disposable bottles. Unlike plastics, made entirely of polyethylene they will not out last their inventory (*Nonwovens Ind.*, 3/1988).

A NEW FERMENTOR FOR INSOLUBLE SUBSTRATED AND VISCOUS BROTH DEVELOPED IN CANADA

The CYCLONE fermentor developed by W.H.E. Bio-systems, Canada, provides high rates of mixing and mass transfer with low operating and capital costs. The unique design features simultaneous aeration — agitation with the circulation of liquid volume from the base to the top of the fermentation vessel, using a pump and recirculation loop. Recirculated broth enters the vessel head tangentially, causing the tank contents to move in a spiraling action.

A well established mixing pattern ensures homogenous culture conditions and eliminates dead zones. The flow continuously washes down the inner walls and fermentor internals. No baffles exist that can cause localised fouling; a clean-in-place may be easily employed on the design. The mixing is suitable for both insoluble substrates and highly viscous culture broths.

The CYCLONE fermentor provides moderate oxygen transfer rates, with efficient power consumption. By sparging into the tank head space only, adequate oxygen transfer may be provided for many fermentations. Primary advantages with this mode of aeration include the prevention of foam generation. Higher oxygen transfer rates may be obtained by modifications to sparger position, sparger design and tank geometry. Of particular interest is the use of sparging in the recycle loop. The passage of the liquid flow across the sparger allows intimate gas/liquid contact and creates a high interfacial area for oxygen transfer. High oxygen transfer rates may be expected, provided sufficient gas-liquid contact may be obtained.

For more information contact: W.H.E. Bio-systems, 100 Klondyke Drive, Weston, Ontario, Canada, M91 1X3.

ENZYME TECHNOLOGY IN BEAMHOUSE PRACTICE — A NEW PUBLICATION FROM CLRI

The National Information Centre of Leather & Allied Industries (NICLAI) and Central Leather Research Institute (CLRI) has brought out a new publication entitled 'Enzyme Technology in Beamhouse Practice' (authors Dr. R. Puvanakrishnan and Dr. S.C. Dhar).

Enzyme technology has made rapid progress in pharmaceutical, textile and dairy industries. But the potential applications of enzymes are not yet fully exploited in leather industry. The text with 10 chapters covers all fundamental and applied aspects of enzymology pertaining to the pretanning processes of leather manufacture, which will greatly benefit the students of leather chemistry, leather technology, biotechnology, tanners and entrepreneurs.

For copies of the publication (Price Rs. 50 plus mailing charges Rs. 8.50), write to The Director, Attn: NICLAI-CLRI, Adyar, Madras-20.

AN EXPLOSIVE GROWTH FORESEEN IN BIOTECH DRUGS IN U.S.A.

In the last year or two there is an explosive growth in R & D on biotech drugs in U.S.A. So far, nine biotech drugs and vaccines have been approved by the FDA. Yet nine times as many biotechnology products, 81 in all, are in development in U.S.A. including 67 products in clinical trials and 14 that, having completed such trials, are awaiting FDA's marketing approvals. So reports the Pharmaceutical Manufacturers Association (PMA), Washington D.C.

PMA has no precise information on the Dollar investment represented by those 81 products. However, it estimates that an average new drug costs about \$125 million and required 7-10 years to develop. Overall, the 81 products then account for a substantial investment reports PMA. In addition, many more biotech products are in pre-clinical development.

In all 50 companies are involved in developing the 81 products. Companies are developing 24 products jointly, an indication that small biotech companies are turning to big drug producers for developing, testing and marketing expertise.

Forty of the 81 products are for cancer treatment, making cancer the most frequently targeted disease of biotech products. Moreover, companies are developing a variety of therapies against cancer, including colony stimulating factors, interferons, interleukins, monoclonal antibodies (MABs) and tumour necrosis factors.

Several vaccines are being tested against hepatitis-B, malaria, Hemophilus, influenza, cancer and respiratory viruses. Amongst peptides under study, include such products as a trial peptide for congestive heart failure. Also on the R & D horizon are factor VIII-C and epidermal growth factor. (*Chem. Wk.*, 7/20/88, p. 44)

IN U.S.A. BIOTECH PATENTS DRUGS ARE IN THE FOREFRONT

The U.S.A. is a world leader in the race to apply biotechnology in the drug field. An analysis of 1987 US biotech patents (by Pharmaceutical Manufacturers Association of USA) shows that pharmaceuticals command the most advanced biotech research. Of the 1,476 biotech patents that were issued last year by the US Patents and Trademarks

Office (PTO) 206 involve genetic engineering, while the remainder use more traditional biotech techniques, such as fermentation of yeast and other microorganisms. Genetic engineering in PMA's definition, includes recombinant-DNA, hybridomas and DNA-probe technologies.

A breakdown of the 206 genetic engineering patent shows that fully 96% or 199 patents are for pharmaceutical research. Moreover, of these 199 patents, 80% or 159 patents, are of US origin; only 20% or 40 patents, are of foreign origin. Outside the US, Japan leads the pack, with 18 genetic engineering patents for drug research. The breakdown is as under:

Source of Patents	No. of patents
US Corporations	89
US Universities	35
US Non-profit organisations	27
US Government & others	8
Foreign origin	40
Total	199

PMA companies also spent last year \$5.4 billion on R & D, an amount almost equal to what National Institute of Health (USA) spent on biomedical research.

Cetus led companies in genetic engineering patents last year, receiving 11, Ortho Pharmaceutical followed with 9 such patents, while Genentech and Eli Lilly each received 8 patents. (*Chem. Wk.*, 7/20/88, p. 10).

AN ALDOLASE ENZYME PROVES TO BE THE KEY TO UNIVERSAL MALARIA VACCINE

Swiss immunologist at Hoffmann La Roche are close to mass-producing a vaccine that could for the first time protect against all types of malaria parasite. This vaccine is based on an aldolase enzyme. This

breakthrough was reported by Ulrich Certa of Hoffmann La Roche.

Until recently researchers looking for a vaccine had concentrated on using proteins on the malarial parasite's coat to stimulate the body's immune system. This type of vaccine is unlikely to protect against all strains of the parasite because each strain has different surface proteins. Antibodies produced to attack one strain of parasite would not recognize another strain. Some parasites can also escape attack by changing the proteins on their outer coat.

Certa and his researchers are investigating the possibility of using a different type of protein, one of parasites own enzymes. Enzymes are integral to the parasite's metabolism, so it could not easily evolve a sufficiently different replacement enzyme.

The Swiss researchers have been working on a protein called P-41, which is an aldolase enzyme that catalyzes the breakdown of glucose to provide the parasite with energy. As the parasite matures and reproduces inside red blood cells, the cell's glucose consumption increases to about 20-times its normal level. The P-41 protein makes the body produce antibodies to the parasite's aldolase and stops the parasite from growing. The antibodies do not affect human aldolase because its structure is very different from that of the parasite's.

In earlier experiments, Certa immunised monkeys using purified P-41 taken from the parasites at the blood stage of the disease. The vaccine protected the monkeys from attack by strains of malaria parasites from as far apart as Zaire, the USA, China and Honduras.

Recently, Swiss researchers confirmed that the antibodies raised

against the protein attack all the strains because the protein's amino acid is virtually the same in each strain.

The researchers have now sequenced the P-41 gene and are ready to make synthetic P-41 molecules by inserting copies of the gene into the bacterium *Escherichia coli*. This is the first step towards mass producing the vaccine. (*Science*, Vol. 240, p. 1036; *New Sci.*, 5/5/88, p. 34).

A NATURAL FUNGUS MAKING PHOSPHATE SOLUBLE DISCOVERED BY CANADIAN RESEARCHERS

Penicillin fungus related to the fuzzy green mould which grows on fruit could cut the amount of fertilizer used by farmers by 90%. This new fungus was discovered by Canadian soil researchers. They isolated a naturally occurring species of *Penicillium bilaji*, which makes phosphate soluble so that it can be absorbed more easily by crops.

Most of the commonly used fertilizers contain phosphate or nitrates, but at present farmers have to add roughly 10-times as much as is actually needed. As it has in the soil the phosphate becomes less and less soluble over the years as it reacts with calcium, iron and aluminium in the earth.

Several microorganisms are known to make phosphates dissolve but none at the rate of the penicillium isolated by Reg Kucey at the Agriculture Canada Research Station in Alberta. This new fungus can also maintain high rates of dissolution in soil, where many of the better known organisms die off.

The fungus which was originally isolated from soil, can stop phosphate fertilizers degenerating into

insoluble forms once they have been applied. It can also transform natural phosphates in the soil into soluble forms, which makes good use of native phosphate.

It may also mean that farmers can use less soluble forms of phosphate to start with, such as rock phosphate. At the moment these must first be dissolved in acid, then dried.

Developing countries can neither afford the expensive equipment necessary to do this, nor afford to import large quantities of prepared phosphate fertiliser. But many countries, such as Malawi have massive natural rock phosphate deposits which they could exploit by using the fungus.

Kucey reports that researchers as yet do not understand the mechanisms by which the fungus acts on the phosphate, but think its metabolism produces organic acids as a byproduct. These acids attach themselves to the metal ions on the insoluble phosphates leaving the phosphates free to dissolve into water in the soil ready for the plant to absorb.

This idea is being considered for practical exploitation by Philom Bios, a Canadian Company that is field testing the organism across Canada and has applied for patents on the technology.

Initial tests have been successful. Crops treated with the fungus alone responded as well as those treated with mono-ammonium phosphate (MAP), a fertilizer widely used in the Canadian prairies.

Further tests are planned for USA and Europe. If they are successful, the fungus could take its place as an essential and vital agricultural product in the coming years. (*New Sci.*, 6/9/88, p. 51).

AIDS VACCINE

Ciba-Geigy's and Chiron Corporation's joint venture -- The Biocine Company -- has developed a vaccine against AIDS. The first studies using this vaccine are being conducted in Geneva, Switzerland, under Professor A. Cruchaud, Head of the Division of Immunology and Allergy, Department of Medicine of the University of Geneva Cantonal Hospital.

The objective of these studies, being conducted in 25 Swiss volunteers, is to verify the overall product safety demonstrated in animal tests and to gain an insight into how Biocine's prospective vaccine behaves in humans. The vaccine is aimed at stimulating the body's defences on several fronts and strengthening the immune systems. In animal tests, it was found to neutralise antibodies and killer T-cells.

The Biocine vaccine employs a genetically engineered antigen developed by Chiron Corporation along with an adjuvant to increase immune responsiveness developed by Ciba-Geigy, in a combination intended to stimulate production of anti-HIV antibodies and cell-mediated immunity. This approach, used in extensive preclinical animal and laboratory tests, elicited a strong immune response against AIDS in several animal species.

The Biocine Company's research on the AIDS vaccine is part of a broad-based programme developed by Ciba-Geigy and Chiron Corporation, utilising biotechnology and other advanced sciences to develop a new generation of synthetic vaccines. Incidentally, Chiron Corporation (USA) is a leading biotechnology company. It was the first company to announce the cloning and sequencing of the entire AIDS virus in 1984.

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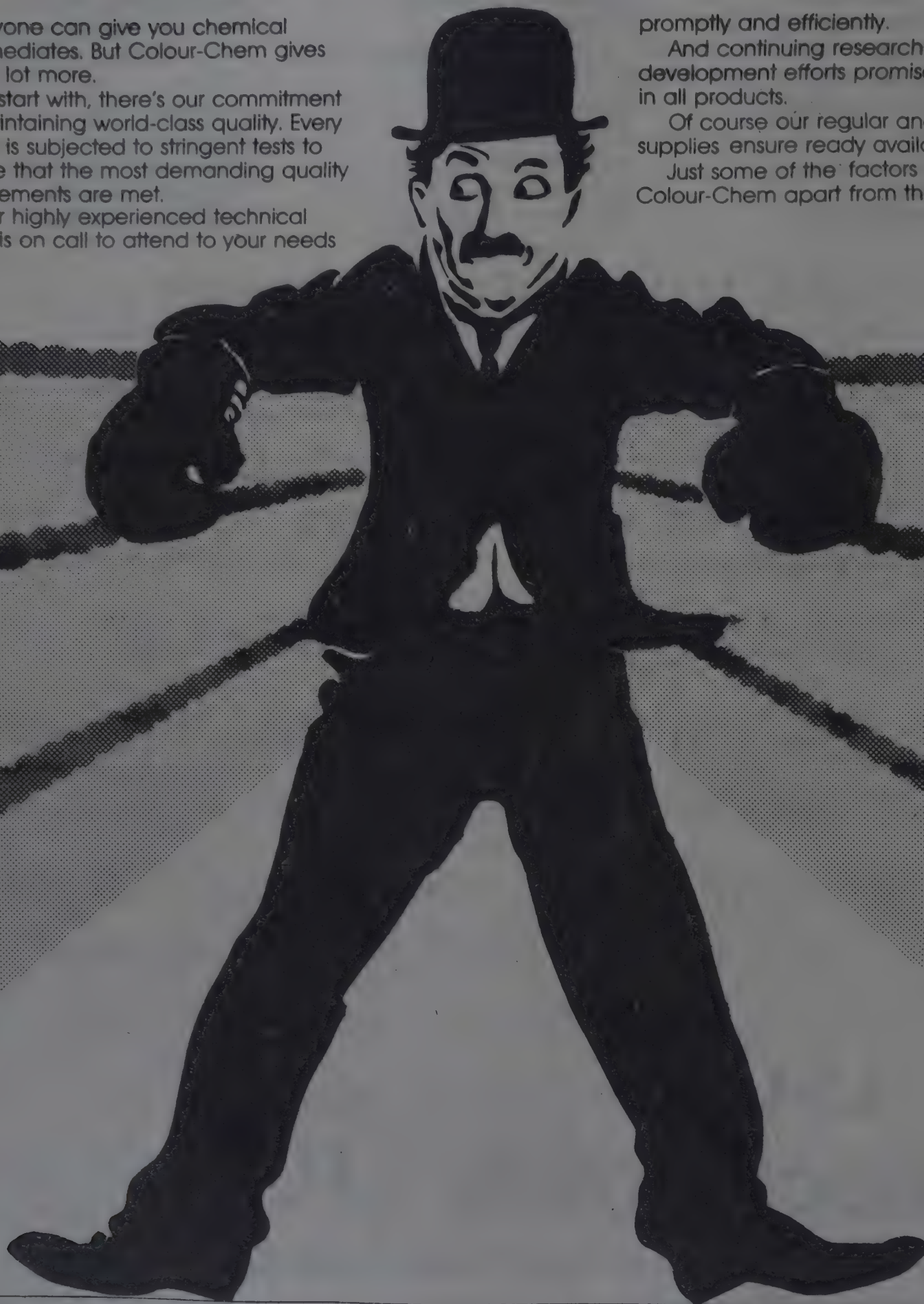
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Prevention of water pollution arising from chemical process industries

S.B. CHANDALIA

Department of Chemical Technology, Matunga, Bombay 400 019.

This paper provides a general background of industries resulting into the introduction of End of Pipe (EOP) pollution control regulations and highlights the role of preventive measures which are complimentary to the existing regulatory and control measures. Several examples from chemical industry are given to emphasize that the obvious method for the prevention of pollution is the modification of technology or development of an alternative technology so that the problem is eliminated. Regarding the pollution abatement facilities, the paper discusses the limitations of conventional approach of pollution control in industry when applied to chemical sector. Some of the unique problems of chemical process industries are discussed and socio-economic aspects pertaining to pollution treatment are covered. The need to consider pollution abatement as an integral part of process technology is clearly brought out.

GENERAL BACKGROUND

In the last century, science and technology has invented many new products and created newer wants. Society has become increasingly complex and highly dependent on the industrial activities. The main thrust of physical sciences was to conquer the nature and manipulate the environment to make the life more comfortable. In this narrow pursuit, the wisdom of ancient cultures was conveniently ignored till the consequences of environmental degradation were too severe to be disregarded.

The industry in general, and the chemical process industry in particular, has been increasingly science-based. Depending on the market response, new products and processes were conceived and with large R and D and design input, the ideas were transformed to commercial reality. The same innovative approach, however, was not adopted when it came to developing environmentally acceptable process or product. The narrow pursuit of profit in a class-based society focuses on minimising the cost of production at the factory level without simultaneously considering the social cost due to environmental damage. The market economy could not consider the economics of nature's processes. Thus the need for ecological balance with a view to ensure the productivity of natural resources on a sustained basis was largely ignored.

The damage caused to the rivers, lakes and other water courses throughout the world due to such narrow pursuit by the industry is too well known to need any elaboration. Due to pressures from public, the governments in most of the countries responded by enacting laws for water pollution control. The system relied almost exclusively on down-stream control. Regulations were framed to monitor and control the discharge of effluents from each industry, and the specifications were laid down for the quality of the effluents discharged after treatment. This resulted into installation of End of Pipe (EOP) pollution control units. Thus, a vast pollution control industry including a large number of environmental consulting organisations came into existence. These were obviously supported by an appropriate educational and technological infrastructure. In this process, environmental protection was achieved by people outside and not in the main stream of production and/or technological activity comprising Research, Development, Design, Testing etc. for the key products considered as profit centres by the organisations.

There is a definite need to shift away from control to prevention. It is now realised by many groups that emphasis should be placed more on eliminating wastes "upstream" -- where these are generated-rather than providing expensive pollution treatment plants "downstream". This paper focuses on these issues and highlights the role of preventive measures which are complimentary to the existing regulatory and control measures.

Alternative technologies

The obvious method for the prevention of pollution is the modification of technology or development of an alternative technology so that the problem is eliminated.

Soda ash

One of the classical example is the Solvay Process for the manufacture of soda ash. In this process, ammonia used in the process is recovered and recycled while the calcium chloride solution is discharged as the waste stream. In a location, where the possibility of marine discharge is ruled out, it poses a problem. The modified version of the Solvay process has, however,

solved this problem. In this version, ammonia is used as a raw material along with sodium chloride, and ammonium chloride is obtained as a by-product along with soda ash. Ammonium chloride so obtained is marketed as a fertilizer.

Amino compounds

The reduction of nitro compounds by conventional iron acid method is highly objectionable because of the problem of disposal of iron sludge which may give toxic leachates. The reduction with sodium disulphide is also unsuitable from environmental angle, since the effluent containing phenols and amines needs to be treated. The technology of choice is, therefore, catalytic reduction by hydrogen, whereby the pollution problems are almost completely eliminated.

Ethylene oxide and Propylene oxide

The conventional method for the manufacture of ethylene oxide via chloro-hydrin has been replaced by the direct oxidation of ethylene because the former was polluting in nature. In the case of propylene oxide, however, the direct oxidation of propylene by air is not feasible and many plants in the world are based on conventional chloro-hydrin route where chlorine is used in the process. A novel approach, however, is the co-oxidation of ethyl benzene and propylene, whereby propylene oxide is produced along with styrene as a co-product. This route has a distinct feature of avoiding the use of chlorine in the process, which does not feature finally in the product molecule. The example cited here is an illustration of the general approach, which tries to eliminate the use of 'free ride' chemicals, that is, chemicals used in stoichiometric quality in the process, which do not provide elements, that appear in the final product.

Phenol

The classical methods for the manufacture of phenol were via chlorobenzene or benzene sulphonic acid. The alkali fusion of one of these intermediates was resorted to for obtaining phenol. In the process, the aqueous stream contained pollutants resulting from the use of 'free ride' chemicals such as chlorine and sulphuric acid. The most commonly used method for the production of phenol is based on oxidation of cumene by air. In this process, benzene is alkylated with propylene and cumene so obtained is oxidised to phenol with acetone as a co-product. The process does not use any 'free-ride' chemical.

Nitro compounds

The nitration of aromatic compounds by mixed acids,

i.e. nitric acid and sulphuric acid is another example where 'free ride' chemical is used. The resulting spent acid is used in the fertiliser industry in India. However, in the future, when the disposal of dilute sulphuric acid may pose a problem, it would be desirable to examine the possibility of using nitric acid alone for nitration reaction. Such an attempt is technologically feasible and should be seriously considered.

Acetaldehyde

The episode of Minimata Bay was historically one of the cases, when the contamination of river waters by toxic effluents was shockingly realised by entire mankind, in 1953. Due to restricted circulation of enclosed waters, there was a considerable bio-accumulation of mercury in fish, which was the staple diet of the surrounding community until fishing was banned in 1955. The tracing of Minimata deaths to methyl mercury was a great advancement in our knowledge. It may be mentioned that the contaminants came from a plant manufacturing acetaldehyde from acetylene, using mercury as a catalyst. Today, due to various techno-economic reasons alternative methods for the manufacture of acetaldehyde are employed where no mercury is used. In U.S.A., ethylene is hydrated to ethyl alcohol which in turn is converted to acetaldehyde. In India, we obtain ethyl alcohol from fermentation of sugar molasses. Another method of manufacture of acetaldehyde involves liquid phase oxidation of ethylene by air using palladium chloride-cupric chloride catalyst.

Caustic soda

In India, except for a few plants based on diaphragm cell, most of the plants are based on mercury cell. The latter is preferred to obtain rayon grade caustic. However, there is a problem of mercury pollution by these units. Considerable research work has been done to resolve these problems. Elaborate method for recovery of mercury from cell house liquor is available. The problem of disposal of sludge containing mercury however is still unresolved. The sludge may give toxic leachates during rains. In this context, it is interesting to note that the recent trend is to change over to membrane cells. It is effected mainly for energy saving but it will also overcome the problem of mercury pollution.

Oxidation products

In the manufacture of fine chemicals and pharmaceuticals the oxidation of organic compounds with sodium dichromate or potassium permanganate under acidic conditions is usually carried out. The process is obviously polluting in nature. However, if oxidation is

carried out with air, dilute nitric acid or aqueous hydrogen peroxide etc., these problems are mostly eliminated. In industry, such a change-over to oxidising agents with less pollution potential is commonly encountered.

POLLUTION ABATEMENT: SALIENT FEATURES PERTAINING TO CHEMICAL INDUSTRY

While the emphasis should be to minimise the pollutants at the source by developing better technological alternatives, the fact remains that certain waste products are invariably formed. These require treatment before the effluents can be discharged. The conventional approach of pollution control in industry is, however, not desirable and is generally not adequate as far as the chemical industry is concerned. Many products are not easily biodegradable. The conventional biodegradation of such species in a common treatment facility, even when feasible, may render the cost of treatment prohibitively high. The emphasis should, therefore, be placed on segregation of such process waste streams and recovery and/or destruction of the pollutants, before these streams are mixed with effluents from various other plants.

The methods usually employed for the recovery of pollutants involve usual separation techniques such as liquid-liquid extraction, adsorption, ion-exchange, membrane separation, etc. These operations are commonly encountered in the chemical industry. The only difference in the present case is that the concentration of pollutants may be at ppm level. The initial investment and operating cost of such units may be high but the price realised due to recovered material may more than offset the incidence of cost due to recovery. Thus, the strategy is highly attractive and may be recognised as one of converting liabilities into assets.

Toxic streams

Many a times, process waste streams contain toxic components. Though in small amounts, their presence may deactivate the micro-organisms used in the conventional activated sludge process. It is, therefore, necessary to detoxify these streams, before they are combined with common effluents for a central treatment facility. Generally, detoxification may involve chemical reactions. In the case of pesticides, this acquires great significance. In general, the information available on the detoxification of process streams is inadequate. Intensive research is required in this area.

It appears that the need for carrying out bio-assay before the treated effluent is discharged is not fully appreciated by industry. In the case when a company

is handling toxic chemicals, the bio-assay should be regularly carried out to rule out the contamination due to toxic releases, because even when the effluent quality meets all other standards, the presence of toxic chemicals in small amount can cause damage to aquatic life. In State Industrial Development Zones, the bio-assay of storm water streams should be periodically done by State Pollution Control Boards to ensure that inadvertent spillages of toxic material in the storm water drain is prevented.

Incineration

Some of the industries pose problems, which are not easily resolved by above mentioned methods. As an example, some of the intermediates for dyestuffs are posing pollution problems, which are defying solutions. In such cases, research should be directed to find out whether the highly pollution streams could be concentrated and subjected to incineration. A similar approach has been made successfully for the treatment of spent liquor from the distillery units.

Total dissolved salts

In many processes, the effluents contain high load of dissolved salts. It is well known that removal of these is very difficult and involves costly methods. It is, therefore, desirable that such plants are located near the sea so that the effluents after treatment could be disposed to saline water zone by a pipe line.

For small plants located away from sea and having relatively small quantity of effluent containing high load of dissolved salts, it may be possible to provide for solar evaporation, provided sufficiently large area of land is acquired. In the rainy season, it may be necessary to provide for an alternative arrangement of evaporators using process steam for the purpose.

Solid wastes

Solid waste may cause water pollution if the leachates from it contain toxic components. It is desirable to provide incinerators for disposing solid wastes, whenever applicable. However, if solid wastes are stored, the provision should be made to collect leachates and the latter should be diverted to effluent treatment plant.

Disposal of treated effluent

The method used for the disposal of treated effluent obviously depends on the specific location of the plant. In the case of alcohol distillery, as an example, the spent liquor may be subjected to anaerobic fermentation, whereby the BOD is brought down to about 5,000 ppm.

Then the effluent may be used for irrigation after necessary dilution, provided adequate water is available and the company has enough land for irrigation. Alternatively the effluent after anaerobic fermentation may be mixed with press mud from sugar industry and the compost may be marketed. However, in the case of an industry which does not have such disposal possibilities, it may be necessary to concentrate and incinerate the spent liquor, because by so doing the disposal problem is eliminated. The ash produced after incineration may be marketed for its fertilizer value.

SOCIO-ECONOMIC ASPECTS

Waste reduction makes economic sense, if and only if the costs and liabilities associated with the generation of waste and pollution are accounted for properly. The initial investment for a pollution prevention project may be higher in some cases. For example, as compared to the reduction of nitro compounds by sodium disulphide, the catalytic reduction by hydrogen involves higher initial investment, if viewed in isolation. However, if the investment on pollution abatement facility is included along with that on plant and equipment based on the conventional method, the choice would tilt in favour of catalytic hydrogenation. It is a different matter that at present many small and large units are violating the pollution laws and, therefore, they continue to prefer the conventional method of reduction of nitro compounds. For example, in the manufacture of paracetamol, p-amino phenol is generally produced by conventional methods and most of the units are hardly treating their effluents adequately. Though desirable for diffusion of entrepreneurship, the policy of reserving the manufacture of p-amino phenol and paracetamol for small scale sector is, therefore, detrimental in rendering the adoption of environmentally safe technology possible.

Recently many developed countries have abandoned the production of some intermediates for dyestuff, because their manufacture involves formidable pollution problems. This apparently provides an opportunity for India to manufacture and export these products. However, this tendency should be discouraged since it amounts to bringing pollution at our door-steps. Only when the pollution problems are resolved, the manufacture of such items may be considered.

It appears that only a few companies in India account for environmental costs properly. Cost of pollution treatment are usually not allocated to production centres, costs of wastes management and potential liabilities are not added to the cost of product. When liabilities are low or almost non-existent as in India, it is not surprising that industries hardly find an economic rationale for developing and/or selecting technology with a view to reduce

effluents to an acceptable level. Industries often maintain that economically feasible technology may not exist for certain pollution problems and the statutory control authorities should relax the norms for effluent quality such as that for COD etc. in such cases. However, no acceptable solution would be attempted unless there is some element of compulsion. Further, a narrow consideration of market economy may damage the very economic growth of the country in the long run. After all, a company readily accepts increased price for its inputs when there are changes in prices due to scarcity, competition etc. Why they should not similarly absorb the enhanced cost due to pollution prevention of treatment is difficult to understand.

POLLUTION ABATEMENT -- AN INTEGRAL PART OF PROCESS TECHNOLOGY

As stated earlier many existing industrial processes were developed prior to the introduction of air and water pollution control laws. Therefore, the technology for these processes did not incorporate the steps required for minimising and treating the pollutants in the gaseous and aqueous streams discharged from the plant. Subsequently, with a view to meet the norms laid down by the statutory control bodies, additional waste-treatment facilities were developed and installed. The industry was initially reluctant to provide this additional investment and considered as if the enforcement of pollution abatement laws was a deterrent to its primary activity of manufacturing a product. It was not realised that the company which profits from the manufacture or use of a product has the primary responsibility of paying for any consequences which results due to the release of toxic components into the environment because of its activity. The society cannot be expected to continue to pay indirectly for the activity of an industry. In many case, because of the growing public awareness, the industry is no more in a position to disregard the consequences of environmental pollution. Therefore, the industry should change its attitude and consider that statutory authorities are not at cross-purpose but actually helping it in its efforts to make the technology environmentally safe and acceptable to the neighbouring zones.

In all future development work, it would be a sound policy to consider pollution abatement as an integral part of the process. No technology should be considered worthy of being evaluated for possible commercial adoption, unless it has resolved environmental problems in an acceptable manner in the light of the current standards laid down by the various statutory control authorities. It may be economically disastrous to implement a commercial plant first and subsequently try to resolve the pollution problems and realise that no acceptable solution is within sight.

(Courtesy: *Chemical Industry News*, Sep. 1988)

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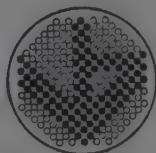
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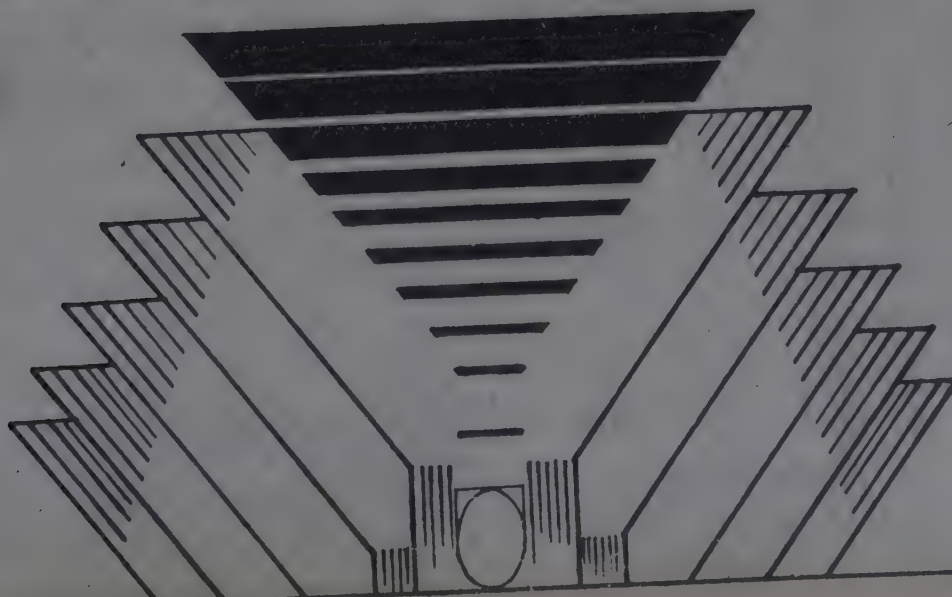
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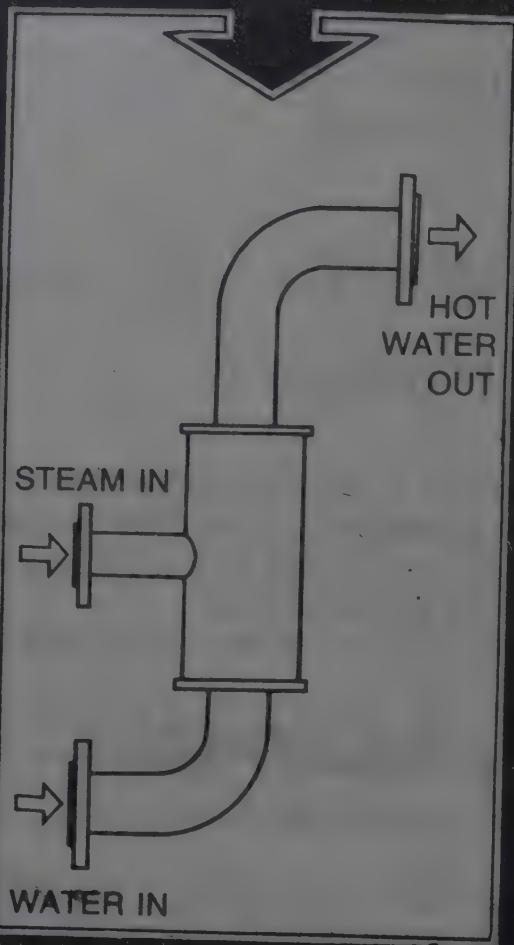
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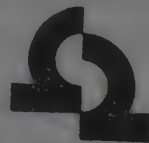
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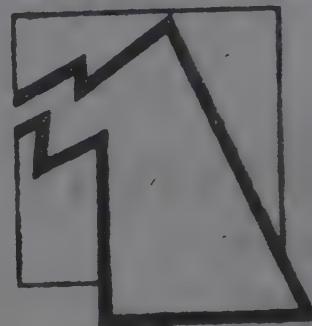
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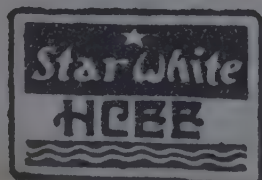
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PROSPECTS OF RUBBERSEED OIL IN LEATHER INDUSTRY

K. VIJAYALAKSHMI, GEETHA BASKAR, K. PARTHASARATHY, V.V.M. RAO and S. RAJADURAI
Central Leather Research Institute, Madras.

ABSTRACT

Rubber seed oil available in India to the tune of 4000 tonnes per annum has good scope as a lubricant in leather making. This oil similar to linseed oil and tobacco seed oil in its composition can be suitably modified to obtain water emulsifiable oil products. The developed products are evaluated for their performance on leathers as fatliquors for their physico-chemical characteristics.

INTRODUCTION

The role of oils and oil based fatliquors in leather manufacture is to prevent the adhesion of leather fibres and to impart certain essential characteristics like softness, smoothness, stretchiness, fullness, suppleness and desired strength properties in order to meet its end uses. The ability of a fatliquor to impart the above mentioned characteristics is chiefly governed by the nature of the oil, its fatty acid composition, reactive sites and the extent of unsaturation. To cite examples, castor oil based fatliquors confer dry and soft feel, fish oil based products impart high degree of suppleness, softness and fullness and sperm oil based products produce waxy feel with high degree of stretchiness, grain smoothness and softness.

India is rich in castor oil, deficient in neatsfoot oil and does not have cod and sperm oil. Hence, functional substitutes for cod, neatsfoot and sperm oil based fatliquors(1-6) were developed based on indigenous marine oils like sardine fish oil and vegetable oils such as cotton seed oil, groundnut oil, rice bran oil, pongam oil, neem oil and animal oils like tallow, frog oil and dog fat either alone or blended in suitable proportions.

Recently there is scarcity of these oils and hence is not available in adequate measures to meet the requirements of the leather industry. Owing to the lessening availability, shortage and great demand, there is a sharp rise in the price of the oil ranging from Rs. 20-30 per kg. Hence the leather industry looks forward to cheaper non-edible oil based lubricants which can confer the desired properties on leather.

In the present investigation, exploratory research work on rubber seed oil which is priced at Rs. 10-12/kg has

been undertaken to study the prospects of its utility in the leather industry as a fatliquor.

Rubber seed oil is obtained from *Havea basilensis*, a byproduct of the rubber plantation industry. The tree is extensively cultivated in tropical regions; Borneo, Ceylon, Malaya, Sumatra, South America and East India. It is learnt via reports received from the Rubber Research Institute, Kerala that this oil is available to the tune of 4000 tonnes per annum. At present, the oil is mainly used for making inferior quality washing soap.

Rubber seed oil belongs to the class of semi-drying oil and is similar to tobacco seed oil and linseed oil in its composition(7). It contains 9-12% palmitic acid, 5-12% arachidic acid, 17-21% oleic acid, 35-38% linoleic acid and 21-24% linolenic acid.

EXPERIMENTAL

The investigation pertains to the analysis of the oil, preparation of fatliquors based on the oil, analysis of the fatliquors and application on leather as lubricant and study the properties of the treated leather.

Analysis

The analysis of the raw oil and the fatliquors was performed as per official method of analysis(8).

Preparation of fatliquors

Two types of fatliquors were prepared (1) sulphated oil and (2) sulphited oil.

Sulphated Oil: It was prepared by reacting the oil with 25-30% sulphuric acid (99.5% purity) at $25 \pm 2^\circ\text{C}$ fol-

lowed by washing with brine and neutralisation to pH 6.5 using 35% sodium hydroxide solution.

Sulphited oil was prepared by subjecting the oil to oxidative sulphitation using 25-30% solution of sodium bisulphite at $70 \pm 5^\circ\text{C}$ for a period of 10-15 hours. The final pH of the product was adjusted to pH 6.5 if necessary, with a suitable base like ammonia or triethanolamine.

Stability of the fatliquors

10% emulsion of the fatliquors was prepared and their stability tested with 5% solutions of calcium chloride, magnesium sulphate (hard water), aluminium sulphate, basic chromium sulphate, formic acid and mineral acid for a duration of 45 minutes.

Application

The fatliquor was tested in the processing of softie uppers. Chrome retanned cow hides cut into sides were neutralised to 5.5. The left sides were fatliquored using rubber seed oil based fatliquor and the right sides with a sulphited vegetable oil (control). 5% true fat was offered in both the cases.

Evaluation of the leather

The leathers (Experimental and Control) were visually assessed for their feel and strength properties. The physical strength parameters were determined as per official method of analysis(8).

RESULTS AND DISCUSSION

The analysis of the raw rubber seed oil as seen in Table-1 reveals high iodine value indicating the presence of greater proportion of unsaturated acid. The sulphation was effectively carried out at low temperatures $25 \pm 2^\circ\text{C}$. The sulphated oil was very clear, forming a stable emulsion in water. The presence of highly unsaturated acids makes it amenable for oxidative sulphitation and the sulphited oil so obtained produces water emulsions showing remarkable stability to hard water and tan liquors (Table-III). This indicates the possibility of introducing fat in the tanning step itself with the simultaneous uniform uptake of fat chrome in a single operation. The chemical characteristics of both the fatliquors are given in Table-II. Of the two fatliquors prepared, the sulphited oil fatliquor was selected for fatliquoring in view of its better stability over the sulphated oil product.

The visual assessment of the fatliquored leathers shown in Table-IV clearly indicated that the leathers treated with sulphited rubber seed oil were more soft, fuller, tighter than those treated with sulphated cotton

seed oil. There is also a marginal improvement in the strength properties of the experimental leathers over the control (Table-V). A study of the rubber seed oil via chemical analysis, preparation of fatliquor and application has proved its viability in the production of high softy leathers with grain tightness. This oil source with its availability at a reasonable price can be tapped for its commercial utility as a leather lubricant as such or in blend with other fatliquors.

ACKNOWLEDGEMENT

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TABLE-I
Analysis of Rubber seed oil

Acid value	= 21.37 mgm KOH/gm
Saponification value	= 226.97 mgms KOH/gm
Iodine value	= 135 gms of I_2 /100 gm
Unsaponifiable	= 0.75%

TABLE-II
Analysis of Rubber seed oil fatliquors

	Sulphated oil	Sulphited oil
Moisture	22.0%	17.1%
T.F.M.	72.5%	80.0%
Alcoholic solubles	30.3%	48.7%
P.E. solubles	42.2%	31.3%
SO_3 content	3.2%	4.5%
Total ash	4.5%	3.2%
pH of 10% emulsion	7.0	6.8

TABLE-III
Stability of Water emulsion 20 ml of 10% emulsion

Solution 5% (3 ml)	Sulphated oil	Sulphited oil
Sodium chloride	Stable	Very stable
Calcium chloride	Not stable, instantaneous, immediate separation of oil	Stable for more than one hour
Magnesium sulphate	-do-	-do-
Barium chromium sulphate	-do-	-do-
Acetic acid	Stable	Highly stable
Hydrochloric acid	Fairly stable	Highly stable

TABLE-IV
Visual Assessment of Fatliquored leathers

	Softness	Fullness	Grain tightness	Overall feel properties
Experiment: Sulphited rubber seed oil	Very soft	Fuller	Shoulders & shanks were tight	Very good
Control: Sulphited Cotton seed oil	Soft	Full	Looseness in shoulders and shanks	Good

TABLE-V
Strength properties of the leathers

	Tensile strength kg/sq. cm	Tonque tear strength kg/cm	Double-hole stitch tear kg/cm	Elongation at break %
Experiment Sulphited rubber seed oil	251	71.5	249.5	60
Control: Sulphited cotton seed oil	224	51.4	220.2	55

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Having got the largest cattle population in the world, it is only natural that, India should be aiming at an export turnover of Rs. 6,000 crores of leather and leather products by the turn of this century. Stepping up exports nearly five times from Rs. 1,245 crores (estimated) in 1987-88 to achieve the dream target will require, among other things, considerable enhancement of tanning capacity of hides and skins. The rub lies here.

Tanneries are not only among the worst polluting industries, but the effluents that they discharge do not lend themselves easily to treatment. Tanneries are water guzzlers; the tanning of one sq. feet of hide requires nearly 60 litres of water. At the end of the tanning process, almost the same quantity of effluents is discharged. Unfortunately, not many tanneries in the country have effective effluent treatment facilities.

The tanneries located on the banks of the Ganga in Uttar Pradesh, Bihar and West Bengal have contributed not a little to polluting the river water. There are, no doubt; a few exceptions. They are the large sized units having the resources to continuously update the effluent treatment technology and with a commitment to keeping the environment clean.

It will, however, be unfair to say that the smaller units are not aware of the damage they are doing to the environment. At this point of time, they do not have access to the technology which has proved to be effective in treating the complex effluents discharged in the process of tanning.

Dr. Z. Kotasek, General Manager (Environment) and Tannery Adviser, Bata India Limited, explained to the press that treatment of tannery effluents is difficult because of their complex composition (sodium sulphide salt, chromium and dissolved vegetable and synthetic proteins). Moreover discharges of effluents are not reg-

ular and effluent composition fluctuates. Dr. Kotasek, a Czech by birth can talk on the subject with authority having done seminal work on tanning and leather technology at the Central Leather Research Institute, Czechoslovakia and later in Sri Lanka, Australia and India.

It will be instructive to study what Bata India has been doing to control pollution at Mokameghat in Bihar where it has got the country's largest tannery. What has to be borne in mind is that the Bata tannery with a capacity to produce 10 million sq. feet of leather a year is situated on the bank of the Ganga. Processing of this quantity leather requires nearly 600 million litres of water. Such a unit could play havoc with the Ganga unless the water discharged by the tannery is properly treated before it finds its way into the river.

Dr. Kotasek, who has supervised the introduction of certain "revolutionary" effluent treatment principles and technologies at Mokameghat, said that with Mr. Thomas Bata, founder of the shoe empire the concern for a clean environment was so strong that he commissioned the services of two world famous architects in 1929 -- Le Corbusier and Karlik -- to prepare an ideal blueprint for a factory-cum-township. The model bringing about a perfect harmony of working and living holds good even today at any Bata centre.

The culture of keeping the environment clean bequeathed by the founder is one of the principal reasons why Bata India has updated the effluent treatment system at Batanagar in West Bengal and at Mokameghat at a capital cost of over Rs. 1 crore. The Ganga action plan is of great relevance to Bata since both the tanneries are located on the banks of the Ganga. Mr. V.K. Lamba, Managing Director, said that the company had accepted the plan as "a technical challenge and ethical obligation."

The challenges of introducing new principles and technologies at Mokameghat where the company undertakes all types of tanning -- chrome, semi-chrome, and vegetable -- were formidable. Unlike at Batanagar which is a smaller tannery with an annual capacity of 5 million sq. feet where processing starts from semi-tanned stage, the Mokameghat factory deals with raw hides and skins. Because of the sheer size and nature of operations,

generation of effluents at Mokameghat is of mind boggling proportions.

When the new effluent treatment project was undertaken at Mokameghat, the engineers were told that they would have to execute the project without in any way interfering with production. The shortage of space -- the factory is squeezed between the river and residential colonies -- threw up problems relating to designing of effluents treatment plant (ETP) and location of drying beds. The ETP which already had a successful trial run will be formally commissioned within a month.

The new approach to pollution control at Mokameghat has two facets -- in-plant actions which result in reduction of volume of effluent discharge and of pollution load of effluents and terminal actions covering treatment of effluents. The in-plant actions include recycling of spent liquors and unpolluted waters, partial replacement of chromium salt by other tanning agents and removal of salt before processing of hides. It is claimed that the actions reduce the volume of discharged effluents by up to 25% and of the pollution load of main effluents by nearly 20%.

The systems introduced at Mokameghat have been decided upon on the basis of an empirical study of domestic treatment plants of industrial wastes and tannery operations in America and Europe. Where Mokameghat makes a radical break with the past is the giving up of the age old procedure of discharging different effluents through a single channel allowing the formation of a complex solution. What has been done at Mokameghat is commissioning of facilities to segregate the effluents and collect them in separate equalising tanks. The segregation of effluents allows effective liquidation of main pollutants. While chemical methods are used to liquidate the principal inorganic pollutants such as salt, lime, sulphides and chromium salt, the biological treatment involves the use of special strains of bacteria for fighting organic pollutants.

Dr. Kotasek explained that even after the chemical and biological treatment, the effluents are not discharged in the river. Instead they are collected in a set of flat evaporative lagoons and exposed to the combined action of sun and air for several days. The introduction of the

new facilities have required extensive relaying of drains and relocation of machines. But the Mokameghat plant was not shut even when extensive work was in progress. Perhaps, Mokameghat is the first tannery in Asia where such sophisticated effluent treatment systems have been introduced.

The collection, dewatering and disposal of sludge also form part of the Mokameghat pollution control project. Trials have shown that the content of chromium salt and mineral substances in the solid waste are so low that the sludge could be used either as fertiliser or as a fuel for biogas. More work will, however, have to be done in this area.

Mr. Lamba said the R&D activities at Bata have been given "a thematic scientific orientation". In keeping with this, an environmental research laboratory is being developed at Mokameghat. Bata has announced its intention to share its knowledge of effluent treatment and environment protection with other tanneries in the country. Dr. Kotasek, who has a rich international exposure considers Indian standards of discharge of treated effluents among the strictest in the world. The result achieved at Mokameghat following the installation of new facilities satisfy the standards very well, claims Dr. Kotasek who is presently giving a lot of thought to combating pollution created by the small tanneries.

There are hundreds of small tanneries in Kanpur, Tangra (Calcutta) and Madras which are discharging large quantities of effluents without proper treatment. As Dr. Kotasek said, the small units can hardly on their own install effective effluent treatment plants. A corporate entity like Bata can afford an increase of nearly 3.5% in the cost of producing leather for the sake of protecting environment.

Dr. Kotasek suggest a "cluster" approach for small tanneries to cope with the pollution problem. What is meant is that a number of small units in the same area should pool resources to set up a common effluent treatment plant. They must be enabled to take in plant actions to reduce the volume effluents per sq. ft of leather tanned. The state governments will have to take the lead in promoting the cluster idea.

(By Kunal Bose in *Economic Times*, 21.8.88)

LEATHER ABSTRACTS

COMPARISON OF CHROMIUM LEACHABILITY FROM TANNERY WASTE USING EPA TOXICITY AND TOXICITY CHARACTERISTIC LEACHING PROCEDURE METHODS, E.E. Menden and F.H. Rutland, *J. Am. Leath. Chem. Assoc.*, **83**, 220, 1988.

Eighty two samples of leather industry solid waste materials were evaluated for chromium leachability by EPA Extraction Procedure Toxicity (EPT) and Toxicity Characteristic Leaching Procedure (TCLP) methods. These samples consisted primarily of wet blue leather trimmings and shavings, dry leather trim scrap, buffing dust and sludge.

For acidic materials (pH <5) such as wet blue and dry leather wastes, TCLP Extraction was 4-5 times more aggressive than EPT due to the complexing effect of acetate ion. The majority of such materials would exceed a regulatory threshold of 5.0 mg/l if based on total Cr rather than Cr (VI). For alkaline sludge wastes, the difference in EPT and TCLP extraction was quite small, if indeed significant and a majority of samples was below 5.0 mg/l. Chromium leachability from dry leather waste was substantially lower than wet blue, despite higher solids content. Thus, leather drying appears to have a major beneficial effect. Efforts to analyse the effects of moisture level, chromium content and pH were inconclusive and more work is planned to further clarify their role in chromium leachability.

PREVENTOL CR -- A NEW HIGHLY EFFECTIVE LEATHER PRESERVATIVE, H.J. Rother, *Leder - Hautmarkt Gevberlinissenschaft and Praxis*, **34**, 8-10, 1988.

Preventol CR, a product of Bayer, Leverkusen is found to be effective against mildew growing on heavily infested wet blues at a concentration of 0.25/l. Bacteria such as *Proteus mirabilis* and *Pseudomonas aeruginosa* are inhibited at 1 g/l. To wet blues, vegetable leather and pickled skins it may be applied in amounts from 0.5 to 0.25% on bated pickled weight. The amounts remaining in spent liquors are negligible. The quantities absorbed by unsplit wet-blues are at least 50% higher in the grain than in the flesh split. The concentration in the middle split is approximately half of that with flesh split. In practice, the treatment with 0.1% or less would, therefore, be sufficient only for a short term. Cool stor-

age splitting before CR tanning is preferable but the length of protection beyond one month should be determined case by case. Preventol CR is miscible with water free of phenolic and organometallic compounds and is based on a benzathiazole derivatives.

STUDIES ON MAJOR POLLUTANTS IN VEGETABLE TANNERY WASTEWATERS, E.A. Lawal, R.O. Adewaye and K. Singh, *J. Leath. Research*, **4**, (4) 63, 1986.

This paper reports a study on toxic pollutants in vegetable tannery waste waters. Sectional effluents from soaking, unhairing, reliming, deliming, bathing and tanning operations were collected from a tanning unit in Zaria processing bagaruox crust leathers and analysed for various characteristics. Results were compared with international standards for discharge to streams, rivers and sewers. The need for proper treatment of these effluents has been identified. Possible control/treatment methods are also suggested.

CHARACTERISTICS OF A PROTEINASE CONCENTRATE FROM *STREPTOMYCES MODERATUS*, S. Chandrasekaran and S.C. Dhar, *J. Leather Research*, **4**, (4), 75, 1986.

The proteinase from *Streptomyces moderatus* (NRRL 3150) was optimally active in the pH range of 8-9, and the optimum temperature was found to be around 60°C. The concentrate has a good pH stability over the range of 8-11 and a thermal stability upto 40°C. It retained 100% of its original activity when stored at 4°C for a period of six months. About 75% of the total protease activity was inhibited by the same group of specific inhibitors. Calcium chloride was found to have a stabilising effect on the proteinase concentrate which was noticed to be more stable in 6M guanidine HCl than in 6M urea.

WET WHITE, *The Leather Manufacturer*, 106, (6), 12, 1988.

This paper presents a review on wet white processing. 'Wet white' processing has significant world-wide implications. Inherent to the process are many benefits, including reduction of chrome disposal problems, resource conservation by largely reducing the amount of chromium the leather industry consumes and produc-

(Continued on Page VII)

NEW PRODUCTS & PROCESSES

AT-TOP SYSTEM

This new technique is a 'dry-finish' suitable for all types of leather, non-polluting with outstanding fastness. Only a minimum of production steps are involved and the machines necessary are available in almost any tannery. At-Top increases the production capacity, expands the range of products and provides a good economical opportunity to refinish off-colours and rest stocks of leather with grain defects without any additional investment. During pressing the thermo plastic layer of At-Top fills defects in a way unknown until now, giving the leather a smooth surface finish but still leaving the possibility for further treatment fashion might ask for. At-Top offers:

- a wide range of colours including transparent which enable short term adoption of fashion trends;
- a constantly good quality end product irrespective of the quality of the base material;
- the possibility to economically finish-off colours, leather with grain defects or other substandard stock;
- savings through reduced auxiliaries stock.

This new technique is developed by Aura-Transfer-Folier, West Germany.

Leather, 190, (4559), 1988

NEW FAT LIQUOR

Yorkshire Chemicals, England has introduced Paradol H1SN a natural oil based fat liquor with excellent penetrating properties and stability to electrolytes. Leather heated with this fatliquor exhibits not only outstanding softness but excellent fastness properties including light and ageing. It is particularly suitable for the production of all soft leathers from high fashion soft shoe through upholstery to garment.

It also improves the wet fastness property of dyes when applied to the dyed leather in a fresh bath after conventional fixation of the dyed leather.

NEW PRESERVATIVES

Two new products Densil P preservative for wet blue and Proxel LD bactericide and wetting agent for use in soaking are developed by ICI. Densil P, non-volatile

liquid product of low toxicity and broad spectrum activity offers a replacement for the traditional products based on mercurials and phenols. Proxel LD a heat-stable liquid bactericide with broad spectrum activity and effective over a pH range of 4-12 limits bacterial attack during the soaking process.

SYNTHELF FAT LIQUORS

Elf Oil (GB) Ltd. have announced the development of a totally new range of synthetic fat-liquors marketed under the brand name *Synthelf* based on specially selected sulphochlorinated raw materials. *Synthelf* products are anionic in nature and exhibit excellent stability to hard water, organic acids and alkalis. Leather produced using these fatliquors have a good handle, excellent light-fastness and will be free from spew. The range includes products modified to improve lubricity and the products have been found to be more substantive from extraction with solvents than natural oil based products.

(Continued from Page VI)

tion of raw materials for use as fertiliser, collagen and protein sources.

DOES THE EXOTIC LEATHER INDUSTRY HAVE ANY CHANCE OF SURVIVAL? Kh. Fuchs, *Leder and Hanta Mart*, 40, 116, 1988.

To a growing extent the exotic leather industry is coming under pressure from a few unreasonable animal protection fanatics, whose emotional, incompetent and destructive criticism, which aims only at confrontation, is fortunately, not supported by the large nature conservation organisations. In this publication, the author is trying to enlist support for trusting cooperation among the authorities, wild life conservationists and the exotic leather industry for the benefit of the animals. In addition to describing some of the new raw materials for the leather industry, this article also discusses the endangered species protection label of the International Association for the protection of Reptiles which has been approved by the Federal and Provincial Governments and by most of the conservation organisations for a two year trial basis.

LEATHER NEWS FROM ABROAD

BIOGAS FROM FLESHINGS

The French Leather and Shoe Research Institute, Centre Technique Cuir Chaussure Marcoquinerce have developed a process to utilise tannery waste in the form of sludge and fleshings to generate biogas on a pilot industrial scale. The process is technically feasible with a high level of biogas produced per kg. of volatile material fed into the digestors although its economic viability is less certain. The researchers found that the production of methane by their plant could eliminate approximately 75% of pollution from the tannery waste, producing a stable waste material which, after processing through a suitable dehydration system, could be reduced by 40% in volume. The two economic factors, the price of heavy fuel oil and the cost of dumping waste material, could affect its cost effectiveness.

-- *Shoe & Leather News*, 3764, 1988.

LEATHER WEEK IN YUGOSLAVIA

The 38th International Leather Footwear and Clothing Week will take place in Zagreb, Yugoslavia from February 21-24, 1989. Exhibitors will include manufacturers of leathers, furs, materials for shoe making, footwear, leather clothing and plant and equipment for making leather footwear and clothing.

-- *Shoe & Leather News*, 3768, 1988.

NEEM OIL COMPOUND AS PRESERVATIVE

In a publication on hide and skin improvement by the FAO of Rome, one interesting point is made in curing and preservation, an area where the environmental pressure is on to reduce the amount of salt used. In India, researchers have found that a mixture of organic compounds derived from neem oil gives a very satisfactory comparison with wet salted controls in terms of hydrolytic bacteria counts as well as exhibiting superior fibre structure.

-- *Shoe & Leather News*, 3768, 1988.

TICK CONTROL

A cattle tick vaccine developed by the Commonwealth

Scientific and Industrial Research (CSIRO) Laboratory has been hailed as a breakthrough which could eliminate the scourge of cattle tick in Australia within three years. It is a collaborative study with a company called Biotechnology Australia and the vaccine will be available to cattle farmers shortly. It is expected to result in savings on dipping in the region of \$150m a year. The present vaccine will have immediate application in Australia and South America (where tick losses are put at \$1 billion annually) and further research could develop a related vaccine for use against African ticks.

-- *Leather*, 190, (4559), 1988.

CHROMIUM REMOVAL FROM WASTE WATER

The final year students of REC, Tiruchi, Tamil Nadu, claim to have worked out an efficient and reliable method of removing chromium from waste water. The process involves filtration of sediments, electrochemical precipitation of chromium salts and filtration of the precipitated salts. The effluent from the tannery is filtered through a sand bed to remove the suspended matter. The filtrate is then admitted into the electrochemical reactor where the chromium salts are precipitated using a DC power source.

-- *Leather*, 190, (4559), 1988.

PIGMENT DISPERSION

One of the most important new products to be launched in the leather industry this year is Sortassist from Hodgson Chemicals. This is a pigment dispersion which enables the tanner to sort his semi-processed leathers with far greater accuracy and reliability than has previously been possible. Sortassist is applied in the tanning drum during normal processing and is picked up by and highlights the grain defects, particularly scars, cuts, abrasions, machine damage, insect damage, etc. Sorting is then greatly facilitated in the limed, depickled and with light skins and wet blue. The Sortassist pigment is subsequently destroyed by an acid process such as pickling and is not carried through into the dyed or crust condition. Equally the application of the product has no effect on the leather quality or characteristics.

-- *Shoe & Leather News*, (3769), 1988.

INDIAN LEATHER SCENE

TN UNITS PLEA FOR ST WAIVER ON HIDES, SKINS

The leather products industry in Tamil Nadu has urged the State Government to exempt dressed hides and skins from the purview of sales tax. The Government had recently brought down the sales tax on hides and skins to 1% from 2%. However, it is argued that since these items are intermediaries for the manufacture of value-added export goods, they should be totally exempt from sales tax to make the export prices more competitive.

According to the Indian Leather Products Association, southern region, the State Government should also abolish the 1% sales tax payable by the tanners on leather taken for job tanning to give boost to exports of leather products from Tamil Nadu. The Association has also made out a case for a rebate on interest charged on term loans extended by TIIC and SIPCOT to 100% export-oriented leather units. At present, a 2% rebate is offered by these agencies to the electronics industry in the State. The association has based its argument on the ground that while most of the leather goods are meant for export consumption, the electronics industry is mainly catering to the domestic market.

The industry also feels it necessary to extend the cash subsidy scheme available for units located in declared backward areas to the leather goods units situated in towns and urban areas. It is pointed out that leather goods manufacturing units are free from pollution and employ educated unemployed girls who are mostly residing in urban centres.

The cash subsidy, it is noted, will improve the liquidity of the units, besides making the products more competitive in prices. In support of its view, the association claims that expertise equal to Italian standards is available in Tamil Nadu. Another demand of the association is reduction of the stamp duty on assets for conversion into limited companies. At present the stamp duty is as high as 13% for this purpose.

It is pointed out that in view of the huge potential for exports, the leather products manufacturers have to necessarily make fresh or additional investments of high order to keep pace with the demand. This will mean converting the existing partnership/proprietorship units into private or public limited companies. As a matter of fact, the leather and leather products industry has predominantly remained either as partnership or proprietorship firms. This apart, the financial institutions have imposed limits on grant of loans to leather units. In the circumstances, it is felt that the only way to help the industry is to reduce the stamp duty.

EFFLUENT TREATMENT PLANT MAY BE READY BY JANUARY

A Rs. 227 lakh common effluent treatment (CET) plant for 82 tanneries in Vaniyambadi in North Arcot district is scheduled for completion during January next. The project is the first of its kind in the country and the technology for it had been provided by the Central Leather Research Institute and implemented by the Tamil Nadu Leather Development Corporation (TALCO).

Mr. A. Govindaraj, Senior Drafting Officer, TALCO, Madras, said it was financed through 20% equity by tanners, 20% equity/subsidy from the State Government, 20% equity/subsidy from the Union Government and 40% loans from financial institutions. However, Mr. P. Khaleelul Rahman, President of the Vaniyambadi Tanners Association, said that it had been requested to make the finance for the project as 25% equity by tanners, 25% subsidy each from the State Government, Central Government and financial institutions. To motivate the tanners and sustain their interest to operate and maintain the project effectively, the TALCO, Vaniyambadi Tanners Environment Control System Limited (VANITEC) was registered in July.

The 82 tanneries which let out about three million litres of effluents a day had been divided into four zones. The treatment plant had two pumping stations and two lift stations. 30% of the work on the plant had already been completed, Mr. Govindaraj said. A sum of Rs. 57.85 lakhs had so far been incurred for the execution of the CET plant, purchase of land, etc. The SIPCOT/TIIC had sanctioned Rs. 111.20 lakhs. The North Arcot District Collector, Mrs. S. Malathi said that CET plants were proposed to be set up at Ambur, Ranipet and Pernambet.

SIPCOT TO SET UP LEATHER COMPLEX

The State Industries Promotion Corporation of Tamil Nadu (SIPCOT) will develop an exclusive complex for the leather industry with all facilities. They will prove a model for other ventures, the State Governor, Dr. P.C. Alexander said.

The leather complex is likely to be located in Chingleput or North Arcot, will be an integrated one housing all facilities like common effluent treatment plant, tanning, finishing and leather products manufacturing. Expert committees will go into the ways and means for setting up the complexes. The Governor said the infrastructure available in SIPCOT complexes will be reviewed by a standing committee headed by the Chief Secretary and it will coordinate

the action taken to provide the facilities to the units. Special emphasis will be laid on adequate social infrastructure in the complexes.

In order to forge a link between the universities/research organisations and industries, the Government is establishing a technology transfer centre which will act as a clearing house of information on technological developments and also to guide the small units.

LEATHER GOODS OFFER RICH EXPORT POTENTIAL

The Indian leather goods industry can become a major export earner and employer by adopting new technologies and proper planning. The country's share in the world market is small due to its inconsistency in product quality, says the Trade Development Authority (TDA) in a recent report on "export prospects for leather goods and accessories, including travel goods".

Lack of good production planning, proper equipment, absence of training of workers, quality and inventory control are the major factors hindering production. "Notwithstanding various constraints," the report, however says, "our export figures for 1986-87 as well as for the first nine months of 1987-88 are extremely heartening." The revised target for leather garment exports for 1987-88 is Rs. 90 crores as against the original target of Rs. 23 crores. The export target for the last two years of the Seventh Plan has also been revised from Rs. 69 crores to Rs. 281 crores.

The report says developed countries such as the US, West Germany and France are finding it difficult to produce leather articles competitively because of the high cost of raw materials and labour and the tendency of the labour force to shirk such low technology industries. The report says India's major competitors are South Korea, Hong Kong, Taiwan, Brazil, Argentina, Portugal, China and various Comecon countries. It says the country's market share of various developed economies is "very marginal". For example, the US imports about Rs. 500 crores worth of leather garments every year out of which Rs. 300 crores is from South Korea. Rising wage levels and other internal political problems of South Korea are forcing US importers to look to other countries for imports. There is tremendous scope for leather exports to the European Economic Community and India has already made headway for these products in West Germany. Italy, Spain, Portugal, Cyprus and Turkey are considered important competitors to India in this area of exports.

The report stresses the need for clearly understanding "the new strategy and technology being adopted by various countries in this field. Computer-aided design, new finishes on leather and computer-aided manufacturing are some of the areas being investigated by manufacturer exporters all over the world. We cannot lag behind in these fields if we are to effectively compete in the international market," the report says. The report says shortage of raw hides and skins in the near future should make the country think in terms of importing raw materials from the US as well as

the USSR which have offered to sell raw hides to India and into the buyback of finished leather products.

RISE IN LEATHER PRODUCTS EXPORT

Export of leather and leather goods topped Rs. 414 crores over the period April-July which represents a 13% increase over the figure for the corresponding period last year. Addressing the first annual general meeting of the Council for Leather Exports (CLE) at Madras, Mr. M. Mohamed Hashim, Chairman of the council, however, noted that compared to the two previous years, the global market for leather and leather products this year has been somewhat subdued so far. This is attributed to factors like a poor winter last year resulting in over-stocking of items like garments and footwear.

Mr. Hashim dismissed the situation as being only temporary. The basic assumption that the demand of the western countries will progressively be met by imports still holds valid, he asserted. In any case, marketing is going to become a big challenge for Indian exporters in the years to come. This is because of the growing strength of countries like Thailand, Indonesia and China in the field. For instance, Chinese shoes are being sold about 25% cheaper than Indian shoes in almost every market in the world.

Mr. Hashim called upon the exporters to draw up a marketing strategy covering the next three or four years and invest a reasonable amount in developing suitable buyers in new or existing markets. The CLE chairman has expressed concern over the rising trend in the prices of domestic raw hides and skins. This he attributed to the limited availability of indigenous raw material with more number of buyers than last year. In this context, he wanted the industry to explore import possibilities and equip themselves suitably to make use of imported raw material. The Council, for its part, has proposed to the Government to take measures for facilitating imports and make them cost effective.

LEATHER EXPORTS: DUTY DRAWBACK REJECTION 'HARMFUL'

The country's leather products industry feels that the Customs Department's current rejection of duty drawback applications filed by leather products exporters might spell cancellation of export orders. Mr. S.S. Sawhney, President of the Indian Leather Products Association, said that the exporters were finding it difficult to service contracts as substantial funds were getting blocked on account of non-payment of drawback.

According to Mr. Sawhney, the Customs Department has started rejecting duty drawback applications if they were not accompanied by Central Excise certificates stating that the exporters had not availed themselves of MODVAT facilities. Although the Customs was insistent on the certificate, on its part, the Central Excise Department, was refusing to issue any clearance certificate because

leather products like handbags, wallets, purses, garments and the like were not covered by MODVAT.

FRENCH PROJECT FOR LEATHER IMPORT FROM INDIA

The French Government is starting a special project to promote import of leather products from India. France will also participate in the India International Leather Fair 1989 and send a delegation as well. This information has been conveyed to the representatives of the Council for Leather Exports who attended the Semaine Du Cuir in Paris recently. Sixtyfive Indian exhibitors participated in the prestigious fair.

According to the council's representatives, China has emerged as a major threat to India in the export of footwear. China is able to offer shoes resembling the ones made in India at prices four to six US dollars cheaper per pair. Brazil, South Korea and Italy are also offering stiff competition. According to Mr. A. Sahasranaman, executive director of the Council for Leather Exports, an objective assessment of the Paris fair would indicate that India's continued success in the leather export field would depend on cost reduction, quality improvement and quality consistency. Maintenance of delivery schedules is also equally important. Frequent complaints of delayed receipt of cargo even when exported by air are not enhancing India's reputation.

LEATHER EXPORT HANDBOOK

A 150-page publication entitled Handbook and Guide to Exporters of Leather and Leather Products has been brought out giving all necessary information that a leather exporter, a new or an established, will need for the success in the challenging task of international marketing. The handbook of the Prosperity Publications gives in the first section the future potential of commodity-wise leather products with statistics showing commodity-wise India's share of global import and untapped potential. Besides explaining 27 export incentives, facilities and assistance, it gives latest rates of CCS and REP licences and mandatory freight rates.

FOOTWEAR EXPORT

Faced with a foreign exchange crunch, the Government has begun to set new targets for exports this year. The target for the leather industry, for instance, has been jacked up to Rs. 1,500 crores from Rs. 1,400 crores proposed by the Council for Leather Exports. According to the council, the revised target means that the footwear sector would have to shoulder a heavy burden by stepping up the export of complete footwear to Rs. 200 crores and shoe uppers to Rs. 450 crores. By all accounts, this is not going to be an easy task. The euphoria over the outstanding export performance of the leather industry in the last three years has been replaced by a more cautious assessment of the outlook. The buoyancy witnessed last year is no longer evident. This has been con-

firmed by the council's representatives who attended the recent prestigious leather fair in Paris.

Of particular concern is the sluggishness in the demand from West Germany and the US for Indian shoes and shoe uppers. Portugal has made a dent on the West German market and Brazil on the US market. Wage levels in Portugal and Brazil are quite low. They also have the advantage of proximity to the markets. A silver lining on the horizon is that the demand from East European countries, including the Soviet Union, is expected to be 15% higher this year. However, the achievement of the revised target would depend on greater exploitation of the large UK market and the tapping of new markets for shoe uppers like France, Spain, Italy, South Korea and Taiwan as also facing competition from China. With the demand for shoe uppers from the west likely to taper off India must change its strategy and concentrate more on complete footwear. The range of footwear manufactured in our country is very limited. The manufacture of a complete range of footwear for different range of footwear for different price segments offers the only hope for survival. With the entry of large business houses into the leather industry, there is no reason why a new strategy which puts a stress on increased productivity, reduction in costs and flexibility in product design cannot be launched.

HARYANA LEATHER CHEMICALS

Haryana Leather Chemicals Ltd. has entered the capital market with a public issue of 8.40 lakh shares of Rs. 10 each for cash at par. The company has been promoted in a joint sector with Haryana State Industrial Development Corporation Ltd. and Mr. N.K. Jain and Associates of Ambala Cantt. With European collaboration the company proposes the production of leather chemicals such as fat-liquors, pigments, binders, waxes, feel modifiers etc. The first three years projections reflect a turnover of Rs. 3 crores and gross profit of Rs. 45 lakhs in the first year, Rs. 4.50 crores turnover and gross profit Rs. 135 lakhs in the second year and Rs. 6 crores turnover and gross profit of Rs. 165 lakhs in the third year.

NB FOOTWEARS TO ENTER CAPITAL MARKET

NB Footwears Limited, a new venture of the Navabharat group, is setting up a Rs. 2.93 crore footwear plant at Cheduvalai near Vellore in North Arcot district of Tamil Nadu. The company proposed a public equity issue worth Rs. 60 lakhs in the form of six lakh shares of Rs. 10 each for cash at par. The principal promoter, Mr. A.L. Prasad, is the chief executive of Navabharat Enterprises Limited. The Navabharat group, has been recognised as the second largest export house in India with an export turnover of over Rs. 40 crores. The plant is expected to go into trial production in January next year and commercial production in March. While the breakeven point is projected at 45%, the plant is expected to achieve 75% capacity in the first year itself.

WESTVACO CORPN. U.S.A

- WESTVACO -- LARGEST PROCESSORS OF CRUDE TALL OIL IN THE WORLD
- WESTVACO -- LARGEST PRODUCER OF ENVELOPES IN THE WORLD
- WESTVACO -- LARGEST PRODUCER OF PULP IN THE WORLD
- WESTVACO -- IS THE ONLY PRODUCER OF SODIUM LIGNO SULFONATE BASED ON SULPHATE PROCESS IN THE WORLD
- WESTVACO -- EMPLOYS OVER 15,000 PERSONNEL AND SALES EXCEED USD 1.7 BILLION P.A.
- WESTVACO -- IS USA'S LARGEST PRODUCER OF ACTIVATED CARBON, WITH REGENERATION SYSTEM
- WESTVACO -- IS MID BELOW AMONGST FORTUNE 500 IN THE USA.
- WESTVACO -- HAVE SIX INTEGRATED PULP AND PAPER MILLS, THREE RESEARCH CENTRES, FIFTEEN CORRUGATED BOX PLANTS, TWO FOLDING CARTON PLANTS, TWO MULTIWALL BAG PLANTS, SIX CHEMICAL PRODUCT PLANTS, OVER 3 MILLION ACRES OF TIMBERLANDS IN 9 STATES
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DATA:

	Unexpanded	Expanded
Particle size, average micron	10	40
range micron	5-30	10-100
Bulk Density, kg/m ³	700	<20
True Density, kg/m ³	1300	<40
Expansion temperature, °C	80-120	
Colour	White	White

FOR FURTHER DETAILS PLEASE CONTACT:

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WITHIN MANY APPLICATION AREAS EXPANCEL MICROSPHERES ARE
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CHEMICALS GREAT CARE MUST BE TAKEN, ESPECIALLY WHEN IN
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EXPANCEL -- USED IN DETERMINATION OF ISOBUTANE AND RESIDUAL MONOMERS IN PVDC MICROSPHERES:

THE METHOD IS DESIGNED FOR THE DETERMINATION OF ISOBUTANE AND RESIDUAL VINYLIDENE CHLORIDE, ACRYLONITRILE AND METHYLMETHACRYLATE IN PDVC-MICROSPHERE; UNEXPANDED AND EXPANDED (DRY OR DRIED), RESIDUAL ACRYLONITRILE AND METHYLMETHACRYLATE ARE OBTAINED AS A SUM OF BOTH.

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New Developments from Japan

Mitsui Toatsu Bares PEEK-based Pipes, Joints for Ultrahigh-Purity Water

In response to the emergence of high-density LSIs, Mitsui Toatsu Chemicals, Inc., has developed polyester ether ketone (PEEK) based pipes and joints (trade name: TALPA pipe) for ultrahigh-purity water used in the manufacture of VLSIs. PEEK is categorized as an engineering plastic.

Polyvinyl chloride, fluoroplastics and polyvinylidene fluoride have hitherto been used as raw material for the said pipes and joints. Commercialization of high-density ICs such as 4 and 16-megabit DRAM chips has called for production of the pipes and joints from other material having far more excellent properties.

The company is considering applying the PEEK-based pipes and joints to the manufacture of large-sized liquid-crystal displays and liquid crystal colour TVs and biotechnology research.

Mitsubishi Aluminum Starts 2 Firms For Foil, Magnetic-Disk Bases

Mitsubishi Aluminum Co., recently set up two equally owned subsidiaries together with Mitsubishi Metal Corp. for production and marketing of aluminum foils and magnetic-disk bases, respectively.

These businesses were undertaken by Mitsubishi Aluminium with bad results. The new projects are intended to bring the businesses into the black as well as expand the related lines in future.

MA Packaging Co. capitalized

at Yen 120 million is preparing to conduct aluminum-foil business with the necessary commercial rights transferred from Mitsubishi Aluminum, and MA Disk Co. capitalized at Yen 50 million will commercialize magnetic-disk bases. The capital of the two will be expanded to Yen 480 million and Yen 200 million, respectively, as of October 1 when they are to launch full-scale operations.

MA Packaging has started with 140 employees and MA Disk, with 60 with their offices located in the head quarters building of Mitsubishi Aluminum in Tokyo.

Fuji to provide thermal paper technique to US Firm

Fuji Photo Film Co. said it has concluded an agreement to

provide techniques to make thermal paper to a leading US paper firm, James River Corp. of Virginia.

Under the agreement, Fuji photo will also grant a right to James River to produce and sell thermal paper, used for facsimiles, in North America.

The agreement will enable James River to join and compete in the fast growing facsimile-related materials market in the U.S. James River has mainly been producing paper towels, tissue paper and industrial paper, Fuji Photo said.

James River's annual sales in the 1988 business year ended last April totaled \$ 5.1 billion.

Idemitsu Petrochemical To Expand Gamma-Lineleic Acid Business

Idemitsu Petrochemical Co. will expand and strengthen its

ATTENTION

Spare Capacity Available

CHEMICAL PLANT LOCATED AT HYDERABAD HAVING SPARE CAPACITY TO MANUFACTURE 3 TONS OF NAPHTHOLS PER MONTH OFFERS THE FACILITY TO EXPORTERS AND OTHER BULK DEALERS ON PROCESSING CHARGE BASIS AGAINST SUPPLY OF RAW MATERIALS OR ON RATE CONTRACT BASIS. INTERESTED PARTIES MAY WRITE TO

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fermentation-process gamma linoleic-acid business.

So far the company has commercialized gamma-linoleic-acid in end-products such as a health food and cooling beverages and sold them through the Idemitsu gasoline-stations route.

Recently the company decided to supply gamma-linoleic-acid as ingredients for confectionery, foodstuffs, cosmetics and feed.

As the first step, the company has teamed up with Sakura Confectionery Co., who has adopted gamma-linoleic-acid as ingredients of its new-type candies, which will be marketed this autumn.

Furthermore, cosmetics and foodstuffs using gamma-linoleic acid are expected to be marketed in succession.

The company expects annual production of gamma-linoleic acid to reach 5 tons within this year.

Magnetic Fluid Produced At Surprisingly Low Cost

Okamura Oil Mill Co., has developed a new process aimed at producing magnetic fluid at markedly low cost — below one-tenth that for conventional production methods including pulverisation and deflocculant processes. Magnetic fluid produced using the new process has a high magnetic force of 450 G and uniformly disperses in solvent. The company has started supplying the product by operating a pilot plant.

Magnetic fluid is so expensive that its application has hitherto been limited to, for example, magnetic seals for electronics equipment and production facilities for semiconductors. The low-cost process is expected to considerably expand related applications.

Magnetic fluid produced by the company comprises triiron-

tetraoxide particles (average diameter: 100A), which are coated with surfactant.

The fluid is produced through the following steps. Ferrous sulfate solution is mixed with ferric-sulfate solution at a molar ratio of 2 : 1. Caustic Soda is added to the resultant product and, as a result, iron hydroxide settles. A specialty flocculant is added thereto, producing hydrosol. Toluene is added to the resultant product and stirred at high speed and anionic surfactant is added thereto, so that iron oxide and toluene are blended with each other. The blended product is pressurized by means of an autoclave and the toluene and water are simultaneously evaporated. As a final step, triiron tetraoxide is taken out therefrom and dispersed in solvent.

Pinhole-free LB Film Seen Being Made Available

Tokai Senko K.K. and a research group led by Professor T. Miyamoto of Institute for Chemical Research attached to Kyoto University have jointly established basic technology for producing Langmuir-Blodgett (LB) film from a cellulose derivative, a natural high-molecular compound.

The new technology facilitates control of the film's hydrophilic/hydrophobic properties and molecular designing of uniform single-molecule LB film. The research group has confirmed that the long-chain alkyl cellulose ester derivative has a regular molecular arrangement and uniform film rarely having pinholes can be produced therefrom.

The basic technology will lead to the production of high-accuracy LB film and pave the way for new cellulose chemistry.

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LB film has come to attract a lot of interest in connection with its application to electronics segments. It has recently been learned that LB film produced from low-molecular products such as stearic acid has many pinholes. The said new-type LB film is expected to overcome this defect. The research group plans to further promote research aimed at putting the new technology into practical use.

Trial Production Of 'Gradient' Material Bared : National Lab

A group of researchers led by K. Shioda of National Research Institute for Metals, Science and Technology Agency has succeeded in producing, on a trial basis, functional gradient materials using Ti-TiN or Cr-CrN deposited on a stainless-steel plate.

In a specially set condition, the materials undergo continuous change in their compositions from Ti to TiN or vice versa, or Cr to CrN, depending on the change in a gas (N_2) flow rate. It is believed that this success will open the way for development of an entirely new type of materials — functional gradient materials, which have so far only been envisaged and not realised.

It is thought that materials in which the composition changes continuously beyond the border of the distinct phases involved, e.g., from a ceramic to a metal, will be theoretically free from fractures resulting from temperature stress. The Japanese researchers have carried out R & D for such materials to demonstrate the effectiveness of this idea.

The gradient change of the components was confirmed when

Ti vapor was deposited at a fixed rate on a stainless-steel sheet by changing the N_2 flow rate. The process used is called the hollow cathode discharge-type physical vapor deposition process.

The researchers will continue R & D for such materials by expanding target substances from nitrides to carbonates and oxides, while seeking the condition for the optimum gradient change of structure.

Toyobo Develops Polyester Film For Tape Automated Bonding

Toyobo Co. has pioneered TP 1003-1 film for tape automated bonding (TAB) and started marketing it for manufacturers of precision machinery and electronics equipment. The marketing prices has been set at a little less than Yen 2,000/m².

The new material is produced from LS-OES polyester film, to which an adhesive layer and cover film are applied. It is about 200 microns thick, 500 mm wide and 1 m long. It features low thermal shrinkage and excellent dimensional stability (MD, -0.07% ; TD, $+0.01\%$). Low thermal shrinkage ensures formation of fine circuit patterns.

Polyimide- and glass-epoxy-based materials are dominantly used as TAB film. They have strong thermal resistance but are expensive. Prices for polyester film are about half or two-thirds of those for polyimide and glass-epoxy films.

TAB film is capable of bonding semiconductor chips to lead frames without bonding wires. In this film, copper foil is attached to a base film and circuit

patterns are etched thereupon. The film enables production of smaller, multipin electronics devices. Demand for it is increasing for use in IC cards, desktop calculators and LCD-driving ICs.

The company is considering developing the product into big-seller items, following flexible printed circuit boards and touch panels.

New-type Artificial Organ Undergoes Animal Tests

A group of researchers at Okayama University reported unique studies on an artificial blood vessel at the recent 5th symposium on biomimetic materials and medical-instrument materials. The symposium was sponsored by The Society of Fiber Science and Technology, Japan.

The studies are related to production of an artificial blood vessel by means of a matrix prepared using the tissue of the living animal in question as well as use of thinner polyester fiber than before for an artificial blood vessel so as to increase adaptability to the living body.

Completion of artificial organs is a major target in the medical-instrument field in the 21st century. R & D efforts in this field are now being mainly focused on so-called hybrid-type artificial organs for which living cells taken out of the living body in question are treated so that they can multiply on the surfaces of organs to increase adaptability before implantation. This endeavor is, however, far from practical application.

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MARKET INFORMATION

Bromine, Menthol Shoot Up

Acute shortage of ready goods pushed up the prices of Bromine liquid to Rs. 90/- in the Bombay's chemical market during this week. Due to seasonal demand, all varieties of menthol shot up by few rupees. Chromic acid moved up to Rs. 53/- from Rs. 48/-. Mercury too registered an increase of a few hundred rupees to Rs. 10,500 per flask. Rangolite (German) reacted to a slight shortage and moved upto Rs. 25/-.

Amongst the items which exhibited downward tendency are Formic acid, MEK and Hydrogen peroxide. Each item was down by Rs. 5 to 6/-. Titanium (rutile) slipped to Rs. 88/- from Rs. 90.

Amongst solvents, toluene shot up to Rs. 24/-. Vinyl acetate monomer was stable at Rs. 46/-.

In the dyes section, MDP and PT Base were in limelight at Rs. 215/-

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

and Rs. 115/- respectively. Aniline oil and intermediates based on aniline oil were in short supply.

(Prices as on 12th October 1988)

INDUSTRIAL CHEMICALS		Per kg					
Ammonium sulphate		2.00	Bleaching powder (33% Cl)	4.20	Calcium chloride 36%		
Ammonium phosphate (Mono)	14.50		Borax (Granular)	13.50	(Anhydrous)	5.00	
Ammonium phosphate (Di)	12.00		Borax (Powder)	21.00	Calcium Carbonate PPT	3.00	
Ammonium carbonate (Di)	17.00		Boric acid (Tech)	22.00	Calcium carbonate (Activated)	3.55	
Ammonium bicarbonate	5.60		Bisphenol-A	69+ST	Camphor (Indian)	100.00	
Ammonium chloride	4.00		Butyl carbitol	50.00	Cresylic acid	50.00	
Ammonium nitrate	6.50		Caustic soda (Flakes)	8.80	Cream of Tartar (Tech.)	70.00	
Arsenic white powder	21.00		Caustic soda (Solid)	8.70	Citric acid (Belgium) (Resale)	45.00	
Acrylamide (Resale)	60.00		Caustic soda (Lye)	6.10	Citric acid (Indian) (Resale)	44.00	
Barium carbonate	6.00		Calcium chloride 70% (Solid)	3.25	Copper sulphate	19.75	
			Calcium chloride 75-80% (fused)	3.50	Chromic acid	53.00	
					Ethylene urea	58.00	

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Ferric chloride (Lumps) (Anhydrous)	5.50	Sodium sulphate (Fine)	6.00	Butyl stearate	
Glue flakes	16.00	Sodium sulphate (Coarse)	5.00	Butanol	(Resale) 30
Glue sheets	8.45	Sodium sulphide 50-52% (Flakes)	11+ST	Benzyl Alcohol	
Gohsenol GH-17	6.75	Sodium sulphide 58-60% (Flakes)	(TCL) 19.00	Benzyl chloride	
Hydro	130+ST	Sodium sulphide pure (Flakes)	12.25	Benzo trichloride	
Hyflosupercell	42.50+ST	Sodium nitrite	(Resale) 640.00	Benzoyl chloride	
Hexamine	24+ST	Sodium chloride 80% (Spain)	90.00	Bromine Liquid	
Industrial Wax	(Resale) 36.00	Soda Ash (Tata)	4.25	Chloroform	25
Litharge	25.00	Soda Ash (Birla)	4.00	Carbon Tetrachloride	1
Lead Acetate (Tech)	15.00	Soda Ash (Imp.)	4.00	Cellosolve	45
Lithopone	31.25	Soda Ash (Imp.)	3.50	Cyclohexanone	48
Magnesium chloride (Crystal)	18+ST	Sodium bicarbonate	6.50	Cyclohexanol	52
Menthol crystal (Flakes) 700+Ex.+ST	1.00	Sodium bisulphite	4.50	Diacetone	(Resale) 35
Menthol bold	665+Ex.+ST	Sodium silicate	3.00	Diethyl Oxalate	34
Menthol crystal bold	665+Ex.+ST	Sodium acetate	6.25	Diethylene glycol (DEG)	43
Magnesium carbonate (Japan)	16.00	Sodium alginate	145+ST	Diethyl Phthalate	52
Magnesium carbonate (Indian)	16.00	Titanium Dioxide (Anatase)	65+ST	Dioctyl Phthalate	56
Maleic Anhydride (per kg) (Resale)	48.00	Titanium Dioxide (Rutile — RCR ₂)	88+ST	Dimethyl Phthalate	28
Mercury (175 lbs)	10500.00	Tartaric acid (Crystal)	94.00	Dioctyl Adipate	52
Nickel chloride	110.00	Trisodium phosphate	4.80	Dibutyl Adipate	42
Oxalic acid	(Resale) 22.00	Thiourea	78+ST	Dipentene	15
Peppermint oil (Rectified)	195+Ex.+ST	Urea (Tech)	2.75	Dimethylamine 40%	12
Potassium carbonate (Indian)	21.00	Zinc Dust	30.00	Dimethylamine 60%	14
Potassium carbonate (Imported)	24.00	Vacuum salt	1.00	Ethyl Acetate	22
Potassium bichromate	23.00	Zinc Oxide	30.00	Ethyl Acrylate	54
Potassium phosphate (Mono)	14.00	Zinc chloride powder (technical)	14.00	Ethylene Dichloride	11
Potassium phosphate (Di)	14.00	Zinc sulphate	5.25	Ethylene Glycol	43+
Polyvinyl alcohol (No. 117)	120+ST	SOLVENTS		Formic Acid (Imp.)	(Resale) 27+
Polyvinyl alcohol (No. 173) (Resale)	130+ST	Per kg.		Formaldehyde	(Resale) 8.0
Polyvinyl alcohol (No. 208)	150.00	Acetic Acid (Glacial) (Resale)	22.00	Glycerine (CP)	51.0
Paraformaldehyde (Resale)	21+ST	Acetic Anhydride (Resale)	34.00	Glycerine (IW)	49.0
Phthalic anhydride 36%	(Resale) 24.00	Acetone (Resale)	16.00	Hydrogen peroxide 50%	(Resale) 25.5
Pentaerythritol	(Resale) 48.00	Adipic Acid	55+ST	Isopropyl Alcohol	21.0
Paraffin wax	(Resale) 14.50	Aceto Acetanilide	50.00	Iso Butyl Alcohol	28.0
Rangolite (German)	75+ST	Aniline Oil	(Resale) 50+ST	Monoethanolamine	(Resale) 30.0
Rangolite (Czech.)	56+ST	Benzoate Plasticiser	45.00	Melamine	(Resale) 53.2
		Butyl acrylate	84+ST	Methyl Ethyl Ketone	43+ST
				Methyl Isobutyl Ketone	46.00
				Methyl Acrylate	42.00
				Methyl Dichloride	(Resale) 23.00

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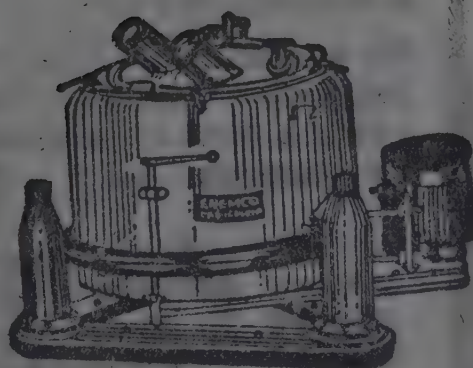
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Ram Baug, Behind State Bank of India, S. V. Road,
 Chincholi, Malad (West), Bombay-400 064.

Phones : Factory : 6821401/6821695 Resi. : 6821894

Agent For South India - M/S. TECSYS

3, Krishnappa Maistry Street, Woods Road, Madras-600 002. Phone : 849727

Cobalt oxide	280.00
Carbitol	60+ST
Meta Cresol	45.00
Nitrobenzene	20.00
Nitric Acid (Con.) (RCF)	2.50
Ortho Cresol	30+ST
Phenol (Resale)	38.00
Propylene Glycol	41+ST
Polyethylene Glycol (No. 200)	39.00
Polyethylene Glycol (No. 400)	42.00
Polyethylene Glycol (No. 500)	42.00
Polyethylene Glycol (No. 1600)	14.00
Polyethylene Glycol (No. 4000)	38.00
Polyethylene Glycol (6000)	50.00
Para Cresol	40.00
Styrene monomer	48+ST
Sorbitol	16.00
Sulphuric Acid	2.10
Trichloroethylene	27.00
Triethanolamine (Resale)	53.25
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
Vinyl Acetate Monomer	46.00

SOLVENTS

Per Litre

Benzene	18.00
N-Heptane	11.00
H-Hexane	12.00
Methanol	9.00
Solvent Naphtha Heavy	10.50
Solvent Naphtha Light	8.50
Toluene	24.00
Xylene	21.00

DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)

Alphanaphthylamine	60.00
Alpha Naphthol (Imp.)	170.00
Aceto Acetic Ester (Methyl)	70.00
Ammonium Molybdate	200.00
Anthraquinone	100.00
Anthranilic Acid	65.00
2-Amino-4-Nitrophenol	150.00
Blue B. Base (Local)	230.00
Beta Naphthol (Atul)	70.00
Benzidine Dihydrochloride (BDH)	90.00
Bromamine Acid	400.00
BON Acid	140.00
Chicago Acid	300.00
Coach Acid	60.00
C. Acid (Imp.)	260.00
Cyanuric Chloride (Japan)	120.00
2, 4, DNCB	30.00
Dihydrothio PTOS (Imp)	600.00
Dimethyl Aniline	68.00
Diethyl Aniline	155.00
Diamino stilbene disulphonic acid	150.00
3, 3-DCB (Imp)	180.00
Gamma Acid (Atul)	180.00
H. Acid (Atul)	155.00
G. Salt	62.00
Isophthalic Acid	45.00
J. Acid	270.00
J. Acid Urea	300.00
K. Acid	105.00
MDPS (German)	190.00

MNA	95.
Meta Ureido Aniline	160.
MPD (Japan)	215.
MPD (Japan)	220.
Naphthenic Acid	12.
N-Methyl J. Acid	410.
N-Methyl Aniline	120.
Naphthalene (Refined)	23.
Ortho Anisidine (OA Imp.)	98.
Ortho Dichloro Benzene (ODCB)	11
OT Base	105
Para Dichloro Benzene (PDCB)	22.
Para Anisidine (PA Imp)	110.
Para Anisidine (PA Local)	95.
PNA	72.
Para Cresidine (Imp.)	350.
Para Amino Azo Benzene (India)	150.
PNCB	36.
Para Amino Acetanilide	155.
1-Phenyl 3-methyl-5 Pyrazolone	125.
Phenyl J. Acid	350.
Para Amino Benzoic Acid	170.
PT Base	115.
Rhoduline Acid	510.
Resist Salt	22.
Resorcinol	150.
Sodium Naphthionate	65.
5-Sulpho-Anthranilic Acid	64.
Sulphanilic Acid	28.
Sulpho Tobias Acid	120.
Trichloro Benzene (TCB)	18.
Tobias Acid	135.

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Contact Manufacturers :—

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Tal. Kalol, Dist. MEHSANA (N. Guj.).
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(ANS-ADI)

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ORTHO NITRO BENZALDEHYDE
a-PICOLINIC ACID

Please contact manufacturers :

TRICHEM LABORATORIES

11, Lalwani Industrial Estate,
14, G. D. Ambekar Marg, Wadala,
BOMBAY-400 031.

Phone : 4123188/4127568

Bombay Dyes Market

(Prices as on 29th September 1988)

PROCION COLOURS		Per Kg.
Golden Yellow HA	181.80	
Brill. Yellow H4G	117.85	
Supra Yellow H-8GP	168.55	
Brill. Yellow HE6G	166.95	
Yellow H-E4R	276.05	
Brill. Yellow H7G	332.30	
Yellow M4R	243.95	
Yellow M GR	226.05	
Brill. Yellow M4G	177.10	
Brill. Yellow M8G	332.30	
Yellow M 3R	217.60	
Brill. Orange H 2B	241.85	
Brill. Red H 7B	157.95	
Brill. Orange M 2B	313.15	
Brill. Red H 8B	169.45	
Brill. Scarlet H RN	245.05	
Supra Red H-3BP	179.30	
Brill. Red H-F3B	243.45	
Brill. Magenta H3	167.00	
Brill. Red M 5B	98.90	
Brill. Red M 8B	173.70	
Brill. Pink MB	137.10	
Brill. Magenta MB	121.55	
Brill. Purple H-3R	180.20	
Brill. Purple H-7B	175.40	
Navy Blue H 3R	298.50	
Brill. Blue H-GR	266.05	
Brill. Blue H 5G	173.10	
Blue H 5R	283.85	
Brill. Blue H 7G	178.70	
Brill. Blue H 7RX	258.15	
Turquoise HA	234.45	
Supra Blue H-3RP	235.70	
Supra Turquoise H 3RP	181.50	
Blue H-ERD	200.80	
Navy Blue H ER	258.39	
Blue H 5RX	232.34	
Navy Blue M 3R	310.95	
Brill. Blue MR	531.75	
Brill. Blue M RX	214.20	
Brill. Blue M-G	382.30	
Blue M 4GD	344.60	
Navy Blue M RE	318.75	
Turquoise M-G	197.80	
Brill. Blue M GX	302.50	
Blue 3R Acra Powder	718.20	
Dark Brown H 6R	248.45	
Cobalt Oxide (per 100)	285.00	
Green H 4BD	269.80	
Green H-E4BI	169.80	
Red Brown H IF	143.25	
Orange Brown H 13	209.05	
Brown M GRN	188.30	
Black H-N	283.35	
SULFUR COLOURS		Per Kg.
Navy Blue	99.85	
Green G	198.55	
Black Grains Extra	63.05	
Black Grains OG	64.55	
Black GXE Conc.	61.69	
Black GXE	52.75	
Black GXR	61.60	
Black Grains 800	54.20	
Black EXR Grains	64.55	
Black EXR Grains 800	51.25	
VAT COLOURS (ICI)		Per Kg.
Yellow 5G Powder Fine	673.15	
Yellow 5G Supra Disperse	439.30	
Yellow 5G Acra Con.	628.75	
Yellow 3R Powder	588.85	
Gold Orange 3G Pdr. Fine	952.15	
Brill. Orange 6R Pdr. Fine	624.35	
Gold Orange 3G Supra Disp.	601.30	
Brill. Orange 6RX Powder	394.30	
Brill. Red 3B Pdr. Fine	997.80	
Brill. Red 3B Supra Disp.	713.20	
Brill. Purple 4R Conc. Pdr.	470.75	
Brill. Purple 3R Acra Powder	690.85	
Brill. Purple 2R Hly Conc.	597.90	
Brill. Purple 4R Supra Disp.	500.05	
Brill. Purple 2R Acra Conc.	625.95	
Blue R Powder Fine	542.15	
Blue BC Conc. Pdr. Fine	522.50	
Blue BC Acra Conc. Pdr. Fine	762.75	
Blue R Conc. Pdr. Fine	577.65	
Blue RR Supra Powder	629.35	
Blue BC Supra Disp.	350.00	
Jade Green XBN Powder Fine	438.00	
Jade Green XBN Acra Conc. Powder	823.00	
Jade Green 2G Pdr. Fine	419.00	
Jade Green 2G Ptg. Paste	125.00	
Jade Green XBN Ptg. Paste	126.00	
Jade Green 2G Supra Disp.	496.00	
Olive Green B Pdr. Fine	399.00	
Olive D Pdr. Fine	444.00	
Olive Green B Supra Disp.	308.00	
Jade Green XBN Supra Disp. (N)	327.00	
Olive OMW Pdr. Fine	698.00	
Olive OMW Supra Disp.	538.00	
Olive R. Pdr. Fine	422.90	
Olive D Supra Disp.	361.70	
Olive R Supra Disp.	363.90	
Olive D. Ptg. Paste	193.00	
Olive Green B. Ptg. Paste	199.10	
Olive Green B Acra Conc.	542.75	
Olive R Acra Conc.	640.00	
Olive Green B Acra Conc.	542.75	
Brown R Pdr. Fine	835.00	
Brown G. Pdr. Fine	795.00	
Brown R Pdr. Fine	659.75	
Dark Brown 3R Pdr. Fine	685.00	
Brown G. Supra Disp.	449.95	
Brown 2G Supra Disp.	554.00	
Brown R Supra Disp.	422.95	
Brown BR Powder	719.00	
Dark Brown 3R Ptg. Paste	217.15	
Dark Brown 3R Supra Disp.	414.55	
Brown G Acra Conc.	733.95	
Brown R Acra Conc.	766.00	
Grey M. Powder Fine	768.50	
Grey M. Supra Disp.	585.45	
Blue BC Acra Conc. Pdr. Fine	762.75	
Direct Black AC Supra Disp.	330.55	
Direct Black AC Pdr. Fine	474.75	
Direct Black CH Supra Disp.	393.20	
Direct ACD Ptg. Paste	217.15	

Delhi Market

DELHI: Oct., 14, 1988 (NNS): Rangolite, stable Bleaching Powder, Pot. Permanganate improved modestly in the Delhi chemicals market last week, while Mercury, Citric acid, Tartaric acid and menthol suffered losses, says NNS. Business was moderate.

Rangolite Germany moved up by Rs. 2/5 at Rs. 60/85 per kg. On negligible imports from China and Germany coupled with good stockists buying. Seasonal demand from Gur manufacturers also aided the sentiment. Sod. Hydro Sulphite also improved by 50 paise/Re. 1 at Rs. 38/44.00 on Gur manufacturers demand. Soda ash gained Rs. 2/5 at Rs. 293/315 due to hike in its prices by manufacturers. Stable Bleaching Powder Shriram, KCI, Maruti and Modi went up by Rs. 5/7 at Rs. 100. Rs. 92, Rs. 90 and Rs. 95 per 25 kg. on hike its prices by manufacturers by Rs. 8 per Katta. Soda bicarb was firm at Rs. 275/280. Caustic soda flakes moved up from Rs. 390/395 to Rs. 395/400 on tight supply position. Camphor Thal also improved by Re. 1 at Rs. 103. Pot. Permanganate hardened

by Rs. 100 at Rs. 2,400. Citric acid, China moved down by Rs. 200 at Rs. 2,200 per 50 kg. On stockists profit taking/selling. Bombay Dyeing Citric acid also lost Rs. 100 at Rs. 2,400. Tartaric acid declined by Rs. 100 at Rs. 6,600 per 50 kg on poor demand from Uttar Pradesh. Menthol bold Medium, flake moved down by Rs. 40/75 at Rs. 500, Rs. 475 and Rs. 440 per kg. on arrival from Sambhal, Moradabad, Rampur and Chandausi and stockists selling due to tight money condition. Mercury lost Rs. 100 at Rs. 10,500 per flask on lower Bombay advices coupled with poor industrial demand. Titanium Dioxide Anatase advanced by Rs. 2 at Rs. 68 early in the week on negligible arrival from Kerala coupled with stockist's selling. Later it came to its previous level on poor demand. Titanium Dioxide RC-822 lost 50 paise per kg. at Rs. 78. Naphthalene Balls were firm at Rs. 1,425.

Dyes & colour section remained dull and featureless on poor local and up-country demand.

(DELHI MARKET RATES AS ON OCTOBER 14, 1988)

Ammonium Bicarb (per 25 kg)	135.00	Boric acid Technical	
Mercury (per flask)	10,500.00	(per 50 kg)	1025.00
Soda ash (per bag)	292-315.00	Paraffin wax (per 50 kg)	705.00
Ammonium chloride		Tartaric acid	
(per 50 kg)	125-180.00	(per 50 kg)	6,600.00
Caustic soda flakes		Borax Granular (per 50 kg)	565.00
(per 50 kg)	395-400.00	Borax Crystal (per 50 kg)	580.00
Citric Acid (per 50 kg)	2200-2400.00	Sodium Nitrate (per 50 kg)	430.00
Stable Bleaching Powder		Sodium Nitrite (per 50 kg)	650-700.00
Shriram (per 25 kg)	100.00	Camphor Powder (per kg)	92.00
Stable Bleaching Powder KCI		Camphor Thal (per kg)	103.00
(per 25 kg)	92.00	Menthol Medium (per kg)	475.00
Stable Bleaching Powder		Menthol Flakes (per kg)	440.00
MODI (per 25 kg)	90.00	Menthol Bold (per kg)	500.00
Sod. Bicarbonate		Glycerine (per kg)	47-48.00
(per 50 kg)	275-280.00	Sodium Silicate	
Sod. Hydro Sulphite		(per quintal)	200-250.00
(per kg)	38-44.00	Hexamine (per kg)	35.00

Acetic Acid Glacial	
(per kg)	18-19.00
Copper Sulphate	
(per quintal)	2300-2500
Formic acid (per kg)	N.A.
Formaldehyde (per kg)	8.00
Hydrogen Peroxide	
(per kg)	26-29.00
Calcium Carbonate	
(per tonne)	2500-4000.00
Acid Slurry Soft (per kg)	24.00
Acid Slurry Hard (per kg)	32.00
Phosphoric Acid (per 50 kg)	900.00
Pot. Nitrate (per quintal)	900-1200.00
Pot. Permanganate	
(per 50 kg)	2,400.00
Sod. Bichromate	
(per 50 kg)	1050-1100.00
Tri-Sod. Phosphate	
(per 50 kg)	350-380.00
Titanium Dioxide Anatase	
(per kg)	66.00
Titanium Dioxide RC-822	
(per kg)	78.00
Zinc Oxide (per mt)	35,000-42,000.00
Phenol Carbolic Acid	
(per kg)	33.00
Carbon Tetrachloride (per kg)	21.00
Chloroform (per kg)	28.00
Sodium Sulphate	
(per 50 kg)	160-180.00
Naphthalene Balls (per 50 kg)	1425.00

DYES & COLOURS (per kg)

Naphthol AS	158.00
Naphthol ASG	249.00
Naphthol ASBS	210.00
Naphthol ASTR	320.00
Naphthol ASOL	202.00
Naphthol ASBO	220.00

DIRECT DYES (per kg)

Black E. Conc.	110-160.00
Diazo Black M	105-130.00
Green B	100-127.00
Blue 2-B	60-92.00
Sky Blue FB	213.00
Basic Auramine	65-110.00
Basic Rhodamine	220-320.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	140-165.00
Acid Orange	45-88.00

Madras Market

There has been good activity reported on the chemicals front and the consumption is good. Also there has been good supplies as a result the prices have been maintained more or less at previous levels. Caustic soda prices registered lower levels due to panic of prices go-

ing down further. Acetic acid and acetic anhydride prices ruled high due to poor availability and good demand. Prices of carbon tetrachloride, chloroform etc. went up due to reported hike in prices by manufacturers. Dyes prices are quoted high due to shortage of intermediates.

(MADRAS MARKET RATE AS ON OCTOBER 15, 1988)

Acetic Acid Glacial (per kg)	19.75	Hydrosulphite of Soda — TCPL (per kg)	40.00
Aluminium Sulphate Iron Free (per MT)	1,900.00	Hydrosulphite of Soda — IDI (per kg)	44.00
Ammonium Bicarbonate (per 25 kg)	125.00	Hydrosulphite of Soda — BASF (per kg)	44.00
Acid Slurry (Soft per kg)	27.00	Hydrogen Peroxide (per kg)	29.00
Ammonium Chloride SPIC (per MT)	2,800.00	Hyflo Supercell (per kg)	23.00
Bleaching Powder (per 25 kg bags)	110.00	Magnesium Carbonate (per kg)	19.00
Borax Granular (per 50 kg)	600.00	Potassium Bichromate (per kg)	27.00
Caustic Soda Flakes — Mettur (Chemicals (per MT)	8,100.00	Phosphoric Acid (per kg)	19.00
Caustic Soda Flakes — Andhra Sugars (per MT)	8,100.00	Phthalic Anhydride (per kg)	24.00
Citric Acid (per kg)	48.00	Pentaerythritol (per kg)	52.00
Copper Sulphate (per 50 kg)	1,050.00	Paraffin Wax (per kg)	13.50
Cresylic Acid 98/99% (per kg)	87.00	Oxalic Acid (per kg)	22.00
Meta Cresol 40/42% (per kg)	40.00	Soda Ash — TAC (per 75 kg bags)	320.00
Para Cresol 98% (per kg)	67.00	Soda Ash — TATA (per 75 kg bags)	320.00
Formic Acid (per kg)	27.00	Sodium Cyanide Indian (per kg)	54.00
Formaldehyde (per kg)	9.00	Sodium Cyanide (Degussa) (per kg)	80.00
Glycerine Carbonate (per kg)	51.00	Sodium Bichromate (per kg)	20.00
		Sodium Bicarbonate (per 50 kg bags)	290.00
		Sodium Nitrate (per 50 kg bags)	425.00

Sodium Nitrite (per 50 kg bags)	750.00
Sodium Silicate (per MT)	4500.00
Sodium Sulphate (per MT)	3,500.00
Sodium Sulphide Flakes (per MT)	13,500.00
Sodium Bisulphite (per 50 kg)	4,000.00
Stearic Acid (per kg)	30.00
Trisodium Phosphate (per 50 kg)	350.00
Titanium Dioxide — Indian (Rutile) (per kg)	62.00
Titanium Dioxide — Imported (Rutile) (per kg)	78.00
Urea Tech (per MT)	2800.00
Zinc Oxide (per kg)	34.00
Zinc Chloride Powder (per kg)	13.00
Zinc Sulphate (per MT)	5,000.00
Di-octyl Phthalate (per MT)	45,000.00
Dibutyl Phthalate (per MT)	45,000.00
Hexamine (per MT)	30,000.00

SOLVENTS

Acetone — HOCL — (per kg)	18.00
Acetone — NOCIL — (per kg)	22.00
Diacetone (per kg)	29.50
Diethyl Glycol (per kg)	48.00
Isopropyl Alcohol (per kg)	22.00
Butanol (per kg)	34.00
Benzene — SAIL — (per lit)	18.00
Toluene — SAIL — (per lit)	19.00
Xylene — SAIL — (per lit)	21.00
Phenol — HOCL — (per kg)	29.00
Turpentine (per lit)	16.50
Trichloroethylene — MCIC — (per kg)	24.50
Carbon Tetra Chloride (per kg)	18.00
Chloroform (per kg)	26.00
Methylene Chloride (per kg)	25.00
Methanol (per kg)	10.00
Methyl Ethyl Ketone (per kg)	48.00
Cellosolve (per kg)	52.00
Butyl Acetate (per kg)	40.00
Ethyl Acetate (per kg)	23.00
Triethanolamine (per kg)	24.00
Sorbitol (per kg)	35.00

Materials Exported

BOMBAY

(From 15-5-88 to 18-5-88)

ALUMINIUM CHLORIDE: To UK: Kline Chemicals Pvt. Ltd., 16,800 kgs., Rs. 2,30,000.

ALUMINIUM CHLORIDE ANHYDROUS: To Felixstowe: Mangalam Inorganics Pvt. Ltd., 19,800 kgs., Rs. 2,35,657.

AROMATIC CHEMICALS: To Singapore: S. H. Kelkar & Co., 2,040 kgs., Rs. 2,54,000.

BENZOIC ACID: To Colombo: Bombay Drug House Pvt. Ltd., 120 kgs., Rs. 5,900.

CALCIUM GLUCONATE: To Havana: Cimmco International, 5,150 kgs., Rs. 2,47,200.

CHICAGO ACID: To Odessa: The Atul Products Ltd., 30,104.2 kgs., Rs. 52,98,507.

CHLORANIL: To New York: Arlabs Ltd., 2,000 kgs., Rs. 1,33,028.

DICALCIUM PHOSPHATE: To Kobe: India Gelatine & Chemicals Ltd., 40,000 kgs., Rs. 1,26,867; To Moji: India Gelatine & Chemicals Ltd., 20,000 kgs., Rs. 63,433; To Nagoya: India Gelatine & Chemicals Ltd., 40,000 kgs., Rs. 1,19,003; To Yokohama: India Gelatine Chemicals Pvt. Ltd., 40,000 kgs., Rs. 1,26,867.

DICHLORO ANTHRAQUINONE: To Rotterdam: IDI Ltd., 1,060 kgs., Rs. 1,24,487.

DICHLORONITROBENZENE: To Osaka: Sunbeam Monochem Pvt. Ltd., 10,000 kgs., Rs. 1,86,765.

ENDOSULPHAN TECH MIN 94%: To Rotterdam: Excel Inds., Ltd., 26,400 kgs., Rs. 21,59,305.

ETHION TECH: To Kaohsiung: Rallis India Ltd., 5000 kgs., Rs. 3,52,000.

FURAZOLIDONE: To Odessa: Seva Enterprises, 30,000 kgs., Rs. 17,40,000.

HEXAMINE: To Singapore: Aegis Chemical Inds. Ltd., 3 MT., Rs. 25,000.

INORGANIC CHEMICAL: To Colombo: Grasim Inds., Ltd., 20,000 kgs., Rs. 48,000.

IRON OXIDE: To Busan: Kiran X-Ray Screens Ltd., 216 kgs., Rs. 3,16,366.

LAURENTS ACID: To Odessa: The Atul Products Ltd., 18,931 kgs., Rs. 14,47,528.

METHYLENE CHLORIDE: To Odessa: Gujarat Alkalies & Chemicals, 144 Mt., Rs. 7,48,800.

METHYL PARATHION TECH: To Manila: Bayer (India) Ltd., 16,000 kgs., Rs. 7,31,585.

OXALIC ACID: To Rotterdam: Excel Inds., Ltd., 40,000 kgs., Rs. 4,71,822.

PARADICHLORO BENZENE: To Odessa: Chemie Organic: 16.5 MT., Rs. 2,10,375.

PARA NITROTOLUENE: To Yokohama: Hindustan Organic Chemicals Ltd., 14,000 kgs., Rs. 2,84,149; To New York: Sahaj Chem. 2000 kgs., Rs. 16,140.

PARA TOLUENE: SULPHONYL CHLORIDE: To New York: Sahaj Chem., 9,500 kgs., Rs. 2,80,472.

PESTICIDES: To Dubai: Voltas International Ltd., 489.6 kgs., Rs. 47,367; To Port Keelung: Ficom Organics Ltd., 16.8 MT., Rs. 1,52,600.

PHOSPHOROUS TRICHLORIDE: To Aqaba: Trenton Investment Pvt. Ltd., 38,400 kgs., Rs. 5,41,756.

SODIUM BICHRIMATE: To Manila: Golden Chemicals P. Ltd., 17,000 kgs., Rs. 2,68,020; To Wembley: Bharat Eximort Co., 1,200 kgs., Rs. 13,600.

SODIUM FORMALDEHYDE SULPHOXYLATE: To Busan: Transpek Inds., Ltd., 34,000 kgs., Rs. 6,88,859.

DYE MATERIALS EXPORTED

BOMBAY

(From 15-5-88 to 18-5-88)

ACID GREEN V: To Keelung: Archana Finance Corpn., 450 kgs., Rs. 1,24,000.

ACRYLAMIDE YELLOW: To Genoa: Sudarshan Chemical Inds., 500 kgs., Rs. 69,284.

BISMARCK BROWN R CONC: To Colombo: Star Enterprises, 1,500 kgs., Rs. 1,05,000.

COALTAR DYES: To Charleston: IDI Ltd., 1,000 kgs., Rs. 2,49,200; To Genoa: IDI Ltd., 2,000 kgs., Rs. 4,31,650; To Keelung: IDI Ltd., 4,000 kgs., Rs. 2,76,000; To Norfolk: IDI Ltd., 3,500 kgs., Rs. 11,18,200; To Rotterdam: IDI Ltd., 1,000 kgs., Rs. 2,20,754.

DIRECT DYESTUFF: To Keelung: Chemitex Enterprise, 2000 kgs., Rs. 1,88,350.

DIRECT FAST VIOLET: To Hong Kong: Formokem Ind., Corpn., 1,000 kgs., Rs. 2,05,000.

DIRECT TURQUOISE BLUE G H/L: To Lagos: Rofee Impex International Pvt. Ltd., 1,000 kgs., Rs. 48,969.

DYE INTERMEDIATE: To Antwerp: The Atul Products Ltd., 1000 kgs., Rs. 87,260; To Barcelona: Priya Chemicals, 1,020 kgs., Rs. 83,752; To Chicago: The Dharamsi Morarji Chemical Co., 3,150 kgs., Rs. 3,23,000; To Genoa: Priya Chemicals, 16,427 kgs., Rs. 9,95,704; To Hamburg: Amritlal Chem. Ltd., 6,000 kgs., Rs. 7,29,276; To Hong Kong: Sajjan Impex Pvt., Ltd., 16,000 kgs., Rs. 14,25,294; Zenith Ltd., 34,100 kgs., Rs. 28,67,612; To Jakarta: Espee Chemicals 5,862 kgs., Rs. 3,89,680.

To Odessa: M.J. Exports Pvt. Ltd., 18,800 kgs., Rs. 13,53,600; To Odessa: Usha International India, 29,500 kgs., Rs. 15,00,196; To New York: Mangalya Trading & Investment, 1,050 kgs., Rs. 1,88,410; Standard Dye Chem., 3,100 kgs., Rs. 3,12,319; To New York: Vasant Chemicals, 3,360 kgs., Rs. 2,17,378; Vibgyor Dyechem, 1,500 kgs., Rs. 1,45,000; To Rotterdam: The Atul Products Ltd., 5,392.5 kgs., Rs. 1,58,637; To Shanghai: Metro Chem. Inds., 28,000 kgs., Rs. 25,29,503.

DYESTUFFS: To Bangkok: Colour-Chem. Ltd., 3,750 kgs., Rs. 1,47,837; To Colombo: Colour Chem Ltd., 750 kgs., Rs. 47,730; kgs., Rs. 12,13,000; To Penang: To Odessa: Ariabs Ltd., 3405 Colour-Chem. Ltd., 1,800 kgs., Rs. 1,04,371; To Port Kelang: Colour-Chem. Ltd., 500 kgs., Rs. 47,510; To Singapore: Colour-Chem. Ltd., 976 kgs., Rs. 35,913.

FAST RED B BASE: To New York: Priya Chemicals, 4000 kgs., Rs. 3,90,000.

FAST RED RC BASE: To Lagos: Roffee Impex Intl Pvt. Ltd., 250 kgs., Rs. 14,207.

FAST SCARLET G BASE: To New York: Priya Chemicals, 1,000 kgs., Rs. 76,637.

GAMMA ACID: To New York: Jansons International, 3,152 kgs., Rs. 3,37,483; Priya Chemicals, 5,550 kgs., Rs. 5,53,564.

H-ACID: To New York: Rang Udyog, 13,424 kgs., Rs. 10,11,796.

MORDANT RED 11: To New York: Gokul Enterprise, 1000 kgs., Rs. 1,64,482.

NAPHTHOL ASG: To Lagos: Roffee Impex Intl Pvt. Ltd., 2,000 kgs., Rs. 1,95,806.

ORGANIC PIGMENTS: To Genoa: Sudarshan Chemical Ind., 11,500 kgs., Rs. 9,05,925.

PTHALOCYANINE GREEN: To Genoa: Sudarshan Chemical Inds., Ltd., 3,000 kgs., Rs. 4,16,291; To Port Kelang: Colour-Chem., Ltd., 3,000 kgs., Rs. 3,60,030.

REACTIVE SUPRA ORANGE: To Lagos: Roffee Impex International Pvt. Ltd., 200 kgs., Rs. 19,738.

REACTIVE SUPRA YELLOW: To Lagos: Roffee Impex International Pvt. Ltd., 200 kgs., Rs. 1,423.

REACTIVE VIOLET 5R: To Bangkok: Metro Chem Industries, 1000 kgs., Rs. 1,34,142.

RHODAMINE B: To Odessa: Usha Intercontinental India, 6,000 kgs., Rs. 10,50,000.

SODIUM NAPHTHIONATE: To New York: Priya Electronics & Chemicals 2,600 kgs., Rs. 1,04,341.

SOLVENT GREEN 3: To New York: Arlabs Ltd., 300 kgs., Rs. 65,530.

SYNTHETIC COALTAR DYES: To Bangkok: United Chemie, 3,000 kgs., Rs. 1,90,039.

SYNTHETIC COALTAR DYES: To Genoa: Chemiequip Ltd., 1,600 kgs., Rs. 2,38,228; To Jakarta: Jindal Dye Intermediate Pvt. Ltd., 3,250 kgs., Rs. 1,30,000; To Liverpool: Space International, 1,000 kgs., Rs. 77,719; To Montreal: Jay Chemi Colour Inds., 2,000 kgs., Rs. 2,09,699; K. Patel Chemo Pharma Pvt. Ltd., 500 kgs., Rs. 80,500; To Odessa: The Atul Products Ltd., 13,000 kgs., Rs. 3,77,500; To Rotterdam: Chemiequip Ltd., 1,000 kgs., Rs. 1,53,997.

SYNTHETIC ORGANIC DYES: To Antwerp: K. Mavji, 10,000 kgs., Rs. 10,53,045; Monarch Dyestuff Ind., 3500 kgs., Rs. 2,44,401; Priya Chem., 1,000 kgs., Rs. 1,33,615; Vipul Dyes & Chemicals Pvt. Ltd., 2,000 kgs., Rs.

2,53,518; To Busan: Priya Chemicals, 700 kgs., Rs. 67,607; Colombo: Brinda Export Agencies, 750 kgs., Rs. 39,100; Dubai: Pams Inds., 660 kgs., Rs. 24,720; To Genca: Amritiaux Ltd., 1,000 kgs., Rs. 4,457; Chika Ltd., 5,000 kgs., Rs. 2,14,942; Metro Chem Inds., 1,000 kgs., Rs. 65,029; Priya Chemicals, 7,115 kgs., Rs. 8,689; To Hong Kong: Brinda Export Agencies, 900 kgs., Rs. 7,200; Indokem Ltd., 1,000 kgs., Rs. 1,19,856; Kabbur Inds. Pvt. Ltd., 500 kgs., Rs. 20,577; Hamburg: Metro Chem Inds., 1,000 kgs., Rs. 2,20,183; To Kolkata: Vipul Dyes & Chemicals Pvt. Ltd., 5,000 kgs., Rs. 3,74,598; To Marseilles: Associates Intermediates & Chemicals, 5,000 kgs., Rs. 3,68,000; To Odessa: Arlabs Limited, 2,600 kgs., Rs. 2,27,450; Usha International India, 23,000 kgs., Rs. 33,90,000; Vipul Dyes & Chemicals Pvt. Ltd., 10,000 kgs., Rs. 4,22,500; To Rotterdam: Karsandas Mavji, 3,000 kgs., Rs. 1,95,218; Metro Chem Inds., 15,000 kgs., Rs. 10,74,917; To Singapore: Little & Co., 600 kgs., Rs. 1,18,217; Vinyl Sulphone MV, 281; To Jakarta: Liberty Export Pvt. Ltd., 2,390 kgs., Rs. 17,47,051.

DRUG MATERIALS EXPORTED BOMBAY (From 15-5-88 to 18-5-88)

AMPICILLIN TRIHYDRATE: To Hamburg: Ranbaxy Lab Ltd., 1,250 kgs., Rs. 10,48,492.

BETAIONONE: To Odessa: Seva Enterprises, 30,420 kgs., Rs. 58,40,640.

CHLOROPHENIRAMINE: To Colombo: Bombay Drug House Pvt. Ltd., 900 kgs., Rs. 8,000.

HYDROCORTISONE: To Colombo: Bombay Drug House Pvt. Ltd., 75 kgs., Rs. 15,500.

IBUPROFEN BP: To Busan: Priya Electronics & Chemicals 1975 kgs., Rs. 4,83,807.

SULPHAMETHOXAZOLE: To Hamburg: Apte Amalgamation Ltd., 8,500 kgs., Rs. 19,26,041.

TRIMETHOPRIM BP: To Hamburg: Marvel Drugs Pvt. Ltd., 1,500 kgs., Rs. 5,97,525.

MATERIALS IMPORTED BOMBAY

(From 1-7-88 to 31-7-88)

ACETANILIDE: From Hungary: Dakshin Pharmls. Ltd., 15,000 kgs., Rs. 2,57,069; Sagar Drugs & Pharms., 15 MTs., Rs. 3,09,725; Standard Organics Ltd., 60,000 kgs., Rs. 9,82,580.

ACETIC ACID GLACIAL: From UK: Unichem Laboratories Ltd., 20,060 kgs., Rs. 1,93,363.

ACETIC ANHYDRIDE: From FRG: Dinesh Chemicals P. Ltd., 30,400 kgs., Rs. 4,31,140; Priya Electronics & Chemicals, 3,000 kgs., Rs. 34,081; From USA: Triochem Products Ltd., 16,166 kgs., Rs. 2,41,718.

ACETO ACETATE PARA CHLORO ANILIDE: From FRG: Sudarshan Chemical Inds., Ltd., 480 kgs., Rs. 79,599.

ACETO ACETIC METHYL ESTER: From Japan: 16,000 kgs., Rs. 3,27,835.

ACETONE: From Taiwan: Khandelwal Hermann Elec. Ltd., 63 kgs., Rs. 6,273.

ACETYL ACETONE: From FRG: Indian Drugs & Pharmaceuticals, 28,120 kgs., Rs. 9,85,074.

N-ACETYL SULPHANILYL CHLORIDE: From Japan: Dakshin Pharmls. Ltd., 17,000 kgs., Rs. 6,29,420.

ACRYLIC ACID: From Japan: Thermax P. Ltd., 32,000 kgs., Rs. 7,01,704.

ACTIVATED CARBON: From USA: Godrej Soaps P. Ltd., 1,814 kgs., Rs. 75,573.

ADIPIC ACID: From FRG: Mehta Pharmaceutical Inds., 1,000 kgs., Rs. 19,224.

ALDRIN TECH: From Netherlands: Hindustan Pulverising Mills, 11 MTs., Rs. 12,16,738.

ALKYL DIMETHYL AMINE: From USA: Hico Products Ltd., 11,757 kgs., Rs. 4,78,760; Aquapharm Chemicals, Co. P. Ltd., 1,633 kgs., Rs. 69,525.

ALPHA ACETO GAMMA BUTYRO LACTONE: From Japan: Ind. Drugs & Pharms. Ltd., 15,000 kgs., Rs. 15,00,912.

ALPHA NAPHTHOL: From Netherlands: IDI Ltd., 6 MTs., Rs. 3,84,488.

ALPHA PHENYLGLYCINE CHLORIDE HYDROCHLORIDE: From Netherlands: Ranbaxy Labs. Ltd., 5,250 kgs., Rs. 16,99,818.

ALUMINIUM DIOXIDE: From FRG: Modern Insulators Ltd., 80 MTs., Rs. 6,94,612.

ALUMINIUM OXIDE: From USA: Grindwell Norton Ltd., 11,36 kgs., Rs. 45,278; From FRG: Insulators and Electrical Co., 20,000 kgs., Rs. 1,83,040; Modern Insulators Ltd., 80 MTs., Rs. 7,03,073.

ALUMINIUM OXIDE SYNTHETIC: From USA: Grindwell Norton Ltd., 11,250 kgs., Rs. 2,45,599.

ALUMINIUM SILICATE: From FRG: Garware Paints Ltd., 6,000 kgs., Rs. 1,05,600.

AROMATIC CHEMICALS: From FRG: Hindustan Lever Ltd., 50 kgs., Rs. 21,971; Naarden India

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Ltd., 50 kgs., Rs. 19,556; Tata Oil Mills Co. Ltd., 180 kgs., Rs. 28,160; From Switzerland: Gupta & Co. (P) Ltd., 550 kgs., Rs. 1,62,225; From UK: Gupta & Co. (P) Ltd., 250 kgs., Rs. 40,835; From USA: Oriental Aromatics, 5,000 kgs., Rs. 3,09,726.

7 AMINO DEACETOXY CEPHALOSPORANIC ACID: From Netherlands: Ranbaxy Labs., Ltd., 740 kgs., Rs. 16,75,778.

AMINOETHYLETHANOLAMINE: From Sweden: Sandoz (India) Ltd., 2,000 kgs., Rs. 61,346.

2-AMINO-5-NITROBENZENE NITRILE: From Switzerland: Sandoz (I) Ltd., 3,986 kgs., Rs. 12,20,068.

2 AMINO 6 PICOLINE: From FRG: Ranbaxy Labs. Ltd., 4,400 kgs., Rs. 6,87,646.

AMMONIUM PERSULPHATE: From FRG: Abdulla Bhai Abdul Khader, 1,000 kgs., Rs. 16,376;

Rallis India Ltd., 3,000 kgs., Rs. 51,265.

AMYL ALCOHOL: From FRG: Ballarpur Inds. Ltd., 38,610 kgs., Rs. 6,04,031.

ANETHOLE: From France: Bal-sara Hygiene Products Ltd., 2,500 kgs., Rs. 8,26,010.

ANILINE: From Romania: Priya Electronics & Chem. Ltd., 30,000 kgs., Rs. 3,60,300.

ANILINE OIL: From FRG: Jindal Dye Intermediates P. Ltd., & Chemicals P. Ltd., 36,000 kgs., 920 kgs., Rs. 12,183; Vipul Dyes Rs. 5,46,664.

ANTIMONY TRIACETATE: From USA: JK Synthetic Ltd., 1,275 kgs., Rs. 1,73,731.

BENZYL CYANIDE: From Denmark: FDC Pvt. Ltd., 2,000 kgs., Rs. 86,866.

BETA PICOLINE: From Belgium: Chemo Pharma Labs. Ltd., 14,440 kgs., Rs. 5,57,600; From

USA: Aarti Drugs P. Ltd., 14,28 kgs., Rs. 4,71,841; Sumedh Chemicals, 14,282 kgs., Rs. 2,71,844.

BETA PICOLINE (MIN 98%): From Belgium: Unique Pharma Ltd., 14,440 kgs., Rs. 5,69,594.

BISPHENOL A: From Brazil: Cibatul Ltd., 48,300 kgs., Rs. 8,33,402.

BISPHENYL CARBONYLAMINE PHENYL SULPHIDE: From UK: Sankey Chemicals P. Ltd., 3 MTs., Rs. 2,11,941.

BORON TRIFLUORIDE: From UK: Indian Petrochemicals Corp., 14.2 MTs., Rs. 22,92,428.

BRIGHT YELLOW SULPHUR: From UAE: Albright Morarji & Pandit Ltd., 2,000 MTs., Rs. 36,54,996; RCF Ltd., 4,000 MTs., Rs. 73,01,932.

BUTENEDIOL: From USA: Excel Inds. Ltd., 65,500 kgs., Rs. 41,50,676.

BUTYL ACRYLATE: From FRG: Exim India, 14,040 kgs., Rs. 3,19,894; From Japan: C. J. Shah & Co., 14,400 kgs., Rs. 3,29,207; D. Jamnadas & Co., 14,400 kgs., Rs. 3,23,993; R. K. Diamonds, 14,400 kgs., Rs. 3,24,534.

BUTYL ACRYLATE MONOMER: From Japan: Genalex Trading & Finance Ltd., 22,032 kgs., Rs. 4,82,912; Monali Traders Favourite, 720 MTs., Rs. 1,75,916.

BUTYL CELLOSOLVE BUTYL GLYCOL: From FRG: UK Paint Inds., 4.04 MTs., Rs. 59,374.

BUTYL GLYCOL: From FRG: Kantilal Manilal & Co., 98.8 MTs., Rs. 1,41,660.

BUTYL METHACRYLATE: From USA: Asian Paints India Ltd., 4,100 Lbs., Rs. 58,385.

BUTYL TITANATE: From UK: Dr. Beck & Co. (I) Ltd., 6,000 kgs., Rs. 2,39,236.

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October 25, 1988

BUTYNOL SOLN.: From FRG: German Remedies Ltd., 7,722 kgs., Rs. 10,26,852.

N-BUTYRALDEHYDE: From FRG: Siva Chemical Inds., 2,100 kgs., Rs. 39,753.

N-BUTYRIC ACID: From FRG: Naarden India Ltd., 2,000 kgs., Rs. 45,369.

CALCIUM CITRATE: From China: Citric India Ltd., 5,000 kgs., Rs. 3,63,123.

CALCIUM LIGNO SULPHONATE: From Norway: Colour Chem. Ltd., 12,000 kgs., Rs. 56,790.

CALCIUM OCTOATE: From Belgium: U.K. Paint Industries, 2.13 MTs., Rs. 55,297.

CALCIUM OXIDE: From Netherlands: B. M. Thakkar & Co. P. Ltd., 1,000 kgs., Rs. 6,944.

CALCIUM SILICIDE: From France: Jindal Strips Ltd., 36 MTs., Rs. 6,61,739.

CARBARYL TECH. 99%: From Israel: Indian Pest Control Co., 48,000 kgs., Rs. 26,11,098.

CARBON BLACK: From Australia: Goodyear India Ltd., 1,16,000 kgs., Rs. 3,67,233; JK Industries Ltd., 406 MTs., Rs. 31,53,325; Modi Rubber Ltd., 2,00,000 kgs., Rs. 16,90,202; From FRG: Deep Jyoti Paints & Chem. P. Ltd., 180 kgs., Rs. 32,385; Esdee Paints P. Ltd., 360 kgs., Rs. 63,989; Solar Printing Inks, 2,520 kgs., Rs. 56,863; From Korea: Modi Rubber Ltd., 42,000 kgs., Rs. 3,46,617; Rainbow Ink & Varnish Mfg. Co., 5 MTs., Rs. 81,882; From Mexico: Navyug India Ltd., 39,918 kgs., Rs. 2,98,433; From Thailand: Andhra Polymers Pvt. Ltd., 6.26 MTs., Rs. 52,489; Ceat Tyres of India Ltd., 118 MTs., Rs. 10,21,455; From USA: Rally Pulverising Mills, 5,000 lbs., Rs. 63,188; Shree Enterprises, 1,814 kgs., Rs. 79,758.

CATECHOL TECH: From UK: Enlite Chemical Inds. P. Ltd., 1,000 kgs., Rs. 54,689.

CATIONIC RED 4G: From UK: Enlite Chemical Inds., P. Ltd., 1,000 kgs., Rs. 54,689; From Korea: Jalan Woollen Inds., 660 kgs., Rs. 28,916.

CAUSTIC SODA: From Poland: Vipul Dye & Chem P. Ltd., 544 kgs., Rs. 3,017.

CELLULOSE ACETATE: From Canada: Hind Filters P. Ltd., 9,570 kgs., Rs. 3,78,584.

CETO STEARYL ALCOHOL: From FRG: Chemical Corpn., 10,000 kgs., Rs. 1,81,474.

CETYL ALCOHOL: From FRG: Chemical Corpn., 2,000 kgs., Rs. 53,504.

CETYL PALMITATE: From FRG: Bayer (I) Ltd., 300 kgs., Rs. 10,630.

CHEMICALS: From Belgium: Chemical De Universe P. Ltd., 17,960 kgs., Rs. 7,76,627; From FRG: Grauer & Weil (I) Ltd., 480 kgs., Rs. 19,534; From Japan: JBA Printing Inks Ltd., 100 kgs., Rs. 23,240.

CHLORINATED POLYPROPYLENE: From Japan: Coates of India Ltd., 300 kgs., Rs. 56,392.

CHLORHEXIDINE GLUCONATE: From Finland: Ipca Health Products P. Ltd., 400 kgs., Rs. 34,332.

CHLOROACETYL CHLORIDE: From Japan: FDC P. Ltd., 2,000 kgs., Rs. 57,966.

3 CHLORO-4-FLUOROANILINE: From Japan: Ranbaxy Labs. Ltd., 1,000 kgs., Rs. 3,84,488.

CHLORO NITRO ANILINE TECH: From FRG: Southern Sea Foods P. Ltd., 1,200 kgs., Rs. 2,19,241.

2 CHLORO PARA TOLUIDINE 5 SULPHONIC ACID: From Korea: PDI Chemicals P. Ltd., 2,000 kgs., Rs. 1,53,225.

CHOLINE CHLORIDE: From FRG: Praful Vitamins, 16,000 kgs., Rs. 2,00,503.

CHROMIUM DIOXIDE: From USA: Garware Plastics & Polyester, 2,000 kgs., Rs. 4,84,597.

COPPER CHROMITE: From FRG: Furfur Chemicals Ltd., 200 kgs., Rs. 47,559.

COUMARIN: From France: Rallis India Ltd., 250 kgs., Rs. 48,654.

CREATININE: From Australia: Cadila Labs. P. Ltd., 60 kgs., Rs. 78,279.

CROTONIC ACID: From FRG: S.G. Pharmaceuticals, 1,520 kgs., Rs. 1,42,433.

CUMENE HYDROPEROXIDE: From FRG: ABS Plastics Ltd., 12,870 kgs., Rs. 2,84,488.

N-CYANOETHYL-N-ACETOXY ETHYL ANILINE: From USA: Sandoz India Ltd., 12,500 kgs., Rs. 2,97,892.

CYCLOHEXANONE: From FRG: Sudarshan Chemical Inds. Ltd., 14,820 kgs., Rs. 2,43,442; Tata Exports Ltd., 14,820 kgs., Rs. 2,72,424; From Italy: All India Medical Corpn., 14.44 MTs., Rs. 2,31,553; Bharat Pesticides Mfg. Co., 14.44 MTs., Rs. 2,31,553; From Netherlands: Mangalya Trading & Invest. P. Ltd., 16,614 kgs., Rs. 2,73,910.

CYCLOHEXANOL: From Italy: IDI Ltd., 14.44 MTs., Rs. 2,31,553.

CYSTEAMINE HYDROCHLORIDE: From Japan: Ranbaxy Labs. Ltd., 2,500 kgs., Rs. 3,06,166.

D-ALPHA PHENYL GLYCINE BASE: From Taiwan: Armour Chemicals P. Ltd., 9,000 kgs., Rs. 18,57,731.

D(—) ALPHA-PHENYL GLYCINE CHLORIDE HYDROCHLORIDE: From Netherlands: Agipi Chemicals Ltd., 3,045 kgs., Rs. 9,90,123.

D-ALPHA PHENYL GLYCINE CHLORIDE HYDROCHLORIDE: From Netherlands: Lyka Labs Ltd., 3,780 kgs., Rs. 12,09,958; Ranbaxy Labs., 5,250 kgs., Rs. 16,85,422.

DL-2-AMINO-1-BUTANOL: From FRG: Cadila Labs., 7,020 kgs., Rs. 7,83,690; Lupin Labs. Ltd., 30,420 kgs., Rs. 34,46,581.

DL METHIONINE FEED GRADE 99%: From France: Avet Chemicals P. Ltd., 2,000 kgs., Rs. 93,986.

DL-METHIONINE: From France: Peugeot Laboratories, 2,000 kgs., Rs. 87,150.

DL-PHENYL PROPANOL-AMINE HCL BP/USP: From USA: Bombay Pharma Products, 100 kgs., Rs. 38,449.

DANE SALT: From Japan: Ranbaxy Labs. Ltd., 2,000 kgs., Rs. 4,83,039; From Singapore: Peni Synth Chemicals, 1,000 kgs., Rs. 2,64,869.

DESMODUR: From FRG: Meridian Inflammables P. Ltd., 105 kgs., Rs. 20,358.

DESMODUR R: From FRG: Navyug India Ltd., 1,725 kgs., Rs. 2,48,569.

DIBUTYL TIN OXIDE: From FRG: Everest Plastic Inds., 800 kgs., Rs. 1,18,897.

DIACETYL PEROXY DICARBONATE: From Sweden: Shriram Vinyl & Chemical Inds., 4,000 kgs., Rs. 5,77,764.

DICHLONE: From Japan: Jindal Dye Intermediate P. Ltd., 50 kgs., Rs. 7,180; From USA: BPCL, 50 kgs., Rs. 7,180.

DICHLORO ACETYL CHLORIDE: From FRG: Synthokem, 1,000 kgs., Rs. 33,417.

2,6 DICHLORO ANILINE: From Japan: Ranbaxy Labs. Ltd., 1,000 kgs., Rs. 4,85,285.

2,4 DICHLORO BENZOIC ACID: From Japan: Sun Export Corpn., 1,400 kgs., Rs. 2,71,570.

DICYANDIAMINE: From FRG: Himachem Labs., 16,000 kgs., Rs. 3,89,232.

DIETHYLAMINOETHYL ACRYLATE: From FRG: BASF India Ltd., 510 kgs., Rs. 39,653.

2,6 DIETHYL ANILINE: From USA: Dhanuka Pesticides Ltd., 13.88 MTs., Rs. 4,15,076.

DIETHYL DIAMINE: From FRG: Pharma Indiana Labs., 4.794 MTs., Rs. 2,10,139.

DIETHYL DIAMINE TECH. 65%: From Spain: Mehta Wire & Metal Ind. P. Ltd., 1,538 MTs., Rs. 45,569.

DIETHYL THIOPHOSPHORYL CHLORIDE: From USA: Gujarat Insecticides Ltd., 32,386 kgs., Rs. 10,65,364.

DIETHYLENE DIAMINE: From Sweden: Eskay Fine Chemicals, 4,370 kgs., Rs. 1,21,418.

DIETHYLENE GLYCOL: From Taiwan: C.J. Shah & Co., 11,250 kgs., Rs. 1,44,094; H & Co., 6,750 kgs., Rs. 86,457.

DI-ISOBUTYL KETONE: From FRG: Haryana Leather Chemical Ltd., 10,888 kgs., Rs. 2,91,122.

DIMER ACID: From USA: Resins & Plastics Ltd., 31,160 Lbs., Rs. 2,21,864.

N-N DIMETHYL ACETAMIDE: From FRG: Ranbaxy Laboratories Ltd., 2,090 kgs., Rs. 53,950.

DIMETHYL ACETAMIDE: From USA: J.K. Synthetics Ltd., 56,174.4 kgs., Rs. 10,59,920.

N N DIMETHYL ANILINE: From Japan: Jindal Dye intermediates P. Ltd., 15,000 kgs., Rs. 3,42,690; Ravi Chem Dye, 30,000 kgs., Rs. 7,60,430.

DIMETHYL DICHLORO SILANE: From FRG: Cadila Labs., 3,000 kgs., Rs. 1,06,282; Concord Pharms. Ltd., 5,000 kgs., Rs. 1,60,355.

DIMETHYL FORMAMIDE: From FRG: Ranbaxy Labs., Ltd., 14.82 kgs., Rs. 2,08,665; From Japan: Aquapharm Chemical Co. P. Ltd., 15,200 kgs., Rs. 2,29,438; Fine Chem P. Ltd., 15.2 MTs., Rs. 2,12,123; Southern Sea Foods, 15,200 kgs., Rs. 2,18,617.

DIMETHYL ISOPHTHALATE: From UK: Century Enka Ltd., 500 kgs., Rs. 25,643.

3,7-DIMETHYL-1-6-OCTADIEN-3-OL: From USA: Oriental Aromatics, 2,902 kgs., Rs. 3,08,276.

DIMETHYL SULPHIDE: From USA: National Organic Chemical Inds., 680 kgs., Rs. 25,380.

DIMETHYL SULPHOXIDE: From France: Keshavlal T. chand, 5,040 kgs., Rs. 1,41,082; From USA: Lupin Labs. Ltd., 082 kgs., Rs. 95,072; Pra Pharmaceuticals P. Ltd., 4 Lbs., Rs. 51,265; Roche Prod Ltd., 2,494.8 kgs., Rs. 62,600; Zora Pharma. P. Ltd., 2,267 kgs., Rs. 52,818.

DIMETHYL TEREPHTHALATE: From Spain: Dr. Beck & Co., Ltd., 380 MTs., Rs. 36,79,689.

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EPICHLOROHYDRIN: From China: Southern Sea Foods P. Ltd., 16,000 kgs., Rs. 3,16,043; From Japan: Grauer & Weil India Ltd., 5,040 kgs., Rs. 1,32,776; Synthetics & Polymer Inds., 15,840 kgs., Rs. 3,98,124.

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ETHYL BENZENE: From USA: McDowell & Co. Ltd., 1,001.012 MTs., Rs. 96,90,779.

ETHYL DIGLYCOL: From Hong Kong: Ganalex Trading & Finance Pvt. Ltd., 37,600 kgs., Rs. 4,81,891.

ETHYL GLYCOL: From FRG: Tata Consultancy Services, 7,644 kgs., Rs. 1,09,122.

2-ETHYL HEXANOIC ACID: From France: Lara Inds., 6,290 kgs., Rs. 1,05,246; From Sweden: Dura Chemicals Corpn., P. Ltd., 29,640 kgs., Rs. 4,39,013.

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ETHYL HEXYL ACRYLATE: From Japan: Arofinex, 6.3 MTs., Rs. 1,51,435.

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ETHYL MERCAPTAN: From Netherlands: Pesticides India, 480 MTs., Rs. 2,56,981.

ETHYL SILICATE: From FRG: Bombay Paints & Allied Products, 2,000 kgs., Rs. 71,182.

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FERRIC OXIDE: From Japan: Cosmo Ferrites Ltd., 28,000 kgs., Rs. 2,25,989.

FORMIC ACID: From FRG: Metroni Drugs P. Ltd., 20,160 kgs., Rs. 1,69,380.

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GERANIOL: From USA: S. M. Kelkar & Co. Ltd., 10,523.52 kgs., Rs. 11,54,078.

GERANYL NITRILE: From Switzerland: Hindustan Lever Ltd., 700 kgs., Rs. 2,11,608.

GLUTARALDEHYDE 50%: From FRG: J.N. Chemicals, 1,075 kgs., Rs. 63,067.

GLYCERINE 99% REFINED: From Bangkok: Dr. Beck & Co. (I) Ltd., 16 MTs., Rs. 2,72,233.

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GLYCOL ETHER: From Netherlands: Natvarlal & Co., 97.812 kgs., Rs. 15,66,979.

GRISEOFULVIN MICROSIZ: From UK: Glindia Ltd., 2,000 kgs., Rs. 26,04,992.

GUM ARABIC: From Nigeria: Metha Shah & Co., 19,000 kgs., Rs. 1,89,936; From Nigeria: Rubar Polymers P. Ltd., 76 kgs., Rs. 8,38,753.

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HELIOTROPIN BENZODIOXAZOLE-5: From Japan: Industrial Perfumes Ltd., 300 kgs., Rs. 1,01,101.

HEXACHLOROCYCLOPENTADINE: From USA: Bharat Pulverising Mills P. Ltd., 71,000 kgs., Rs. 18,30,019.

HEXAFLUORO ETHANE: From USA: Bharat Electronics Ltd., 73.48 kgs., Rs. 29,341.

HEXAMETHYLENE DIAMINE: From FRG: Viper Chemicals, 960 kgs., Rs. 75,248.

HYDRAZINE HYDRATE: From France: Gupta Trading Co., 16,000 kgs., Rs. 4,18,317; From Japan: Chandra Carpets P. Ltd., 5,000 kgs., Rs. 1,45,963.

HYDROGEN CHLORIDE: From UK: Wyeth Laboratories, 14 Nos., Rs. 47,203.

HYDROGEN PEROXIDE 50%: From Austria: OCM Carpets & Woollen Inds., 15,330 kgs., Rs.

1,54,996; Pluto Chemical Ltd. 40.95 MTs., Rs. 4,02,366; From Belgium: B. Pankajkumar & Co. 17.28 MTs., Rs. 1,67,421; Ka Chem., 17.28 MTs., Rs. 1,54,440; From Netherlands: Hindoo tan Spg. & Wvg. Mills, 5.9 MTs., Rs. 57,100.

HYDROGEN PEROXIDE: From Belgium: Southern Sea Foods P. Ltd., 34,560 kgs., Rs. 3,39,581; From Netherlands: Sheth Investment & Trading, 38.48 MTs., Rs. 3,64,426; From Spain: B.I. Mehta, 8,550 kgs., Rs. 82,428; Kilachand Devchand & Co. P. Ltd., 17,100 kgs., Rs. 1,52,864; Mittapalli Aduinarayana Co. Ltd., 34.2 MTs., Rs. 2,93,536; Pluto Chemical Ltd., 89.815 MTs., Rs. 8,58,746; From Taiwan: Lucky Inds., 31.920 MTs., Rs. 2,86,288; Sagar Corpn., 7.98 MTs., Rs. 74,516; From USA: Semiconductor Complex Ltd., 13.5 MTs., Rs. 2,82,359.

HYDROGEN PEROXIDE 50%: From Taiwan: Shanti Textile Inds., 7,980 kgs., Rs. 77,317; Vishal Commercial Corpn., 15,960 kgs., Rs. 1,54,632; From UK: Bayer (I) Ltd., 17,745 kgs., Rs. 1,71,832.

HYDROSULPHITE CONC: From FRG: Allchems, 20,000 kgs., Rs. 2,37,244; Shree Laxmi Trading Corpn., 20,000 kgs., Rs. 2,38,711; From FRG: Virag Enterprise, 20,000 kgs., Rs. 2,42,084.

HYDROXYLAMINE SULPHATE: From FRG: Roche Products Ltd., 18,000 kgs., Rs. 4,64,639; Sandoz India Ltd., 15,000 kgs., Rs. 4,03,791; From Netherlands: Apte Amalgamations Ltd., 40 MTs., Rs. 10,27,636.

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IODINE CRUDE: From China: G. Amphray Labs., 30,000 kgs., Rs. 75,82,579.

IODINE CRUDE: From China: Pure Drugs India, 3,500 kgs., Rs. 9,52,041; From Japan: Lub Cut Incorporation, 2,000 kgs., Rs. 5,52,523; Eskay Fine Chemicals, 500 kgs., Rs. 1,31,993; Ishita Pharms., 2,000 kgs., Rs. 5,53,947; Nirav Fine Chemicals, 2,000 kgs., Rs. 5,39,205; Parag Pharms. (I) P. Ltd., 15,500 kgs., Rs. 46,33,439; Pharma Chem Labs., 500 kgs., Rs. 1,33,397; Pure Drugs (I) Ltd., 6,500 kgs., Rs. 19,06,775; Santosh Pharmaceuticals, 1,000 kgs., Rs. 2,63,986.

IODINE CRUDE 99.5% : From China : G. Amphray Labs., 10,000 kgs., Rs. 25,63,251.

ISOBORNYL ACETATE : From GDR : Twincity Organics P. Ltd., 50,000 kgs., Rs. 7,55,626.

ISOBUTYRALDEHYDE : From FRG : Indian Org. & Pharms. Ltd., 4,950 kgs., Rs. 89,056.

ISOCYANURATE : From Japan : Dr. Beck & Co., (I) Ltd., 17,000 kgs., Rs. 6,29,420.

ISOPHORONE : From Japan : JBA Printing Inks. Ltd., 4,940 kgs., Rs. 89,692.

ISOPHTHALIC ACID : From Japan : Rainbow Ink & Varnish Mfg. Co., 6MTs., Rs. 88,005.

L-LYSINE MONO HCL USP : From Japan: Tata Exports Ltd., 1,000 kgs., Rs. 59,723.

LAB CHEMICALS: From FRG: Ratilal D. Ghelani, 742.44 kgs., Rs. 2,90,192.

LACTOSE: From FRG: Glindia Ltd., 18 MTs., Rs. 2,15,032.

LINALOOL: From FRG: Gupta & Co. P. Ltd., 1,020 kgs., Rs.

1,35,637; Hindustan Lever Ltd., 10,200 kgs., Rs. 12,92,132.

LINALOOL OXIDE: From Switzerland: Oriental Aromatics., 30 kgs., Rs. 13,672.

LITHIUM CARBONATE: From USA: S.K. Corporation (I) 2,200 Lbs., Rs. 46,915.

LITHIUM CARBONATE TECH: From USA: Sterling Orgo & Inorgo Chemical, 1,497 kgs., Rs. 45,894.

LITHIUM HYDROXIDE MONO-HYDRATE: From USA: BPCL 35 MTs., Rs. 20,01,620.

LIVIKSOL: From FRG: Labela Pharm., 540 kgs., Rs. 70,834.

MANCOZEB TECH: From Netherlands: New Chemie Inds. P. Ltd., 12 MTs., Rs. 3,69,962.

MANGANESE CARBONATE : From FRG: Cosmo Ferrites Ltd., 5,000 kgs., Rs. 50,637.

MANGANOUS OXIDE: From USA: Morris Electronics Ltd., 16,057 kgs., Rs. 5,29,311.

MERCURY 99%: From China: United Phosphorus Ltd., 6,900 kgs., Rs. 8,28,782.

META NITRO CHLORO BENZENE: From France: Hiremath Chemicals Ltd., 19.7 MTs., Rs. 78,038.

META PHENYLENE DIAMINE: From Hong Kong: Vivid Exports, 1,000 kgs., Rs. 60,482.

META TOLUENE DIAMINE CRUDE: From Japan: Azo Products, 1000 kgs., Rs. 38,080.

N-METHYL ACETO ACETAMIDE: From Japan: Sudarshan Chemical Inds., Ltd., 16,000 kgs., Rs. 3,73,699.

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TATE: From Japan: Nirlac Chemicals, 1,500 kgs., Rs. 55,736; Parke Davis India Ltd., 5,000 kgs., Rs. 1,78,356.

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N-METHYL 2 PYROLIDONE :

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METHYLENE CHLORIDE:

From UK: Ranbaxy Labs., Ltd., 37,728 kgs., Rs. 2,91,434; Sandoz India Ltd., 56,592 kgs., Rs. 4,03,524.

METHYLENE DIBROMIDE :

From Israel: Aquapharm Chemical Co. Pvt. Ltd., 1,750 kgs., Rs. 74,762.

METHYLENE PHOSPHONIC

ACID: From Belgium: Pankaj Kumar & Co., 272.2 kgs., Rs. 13,059.

METHOXY PROPYLAMIDE :

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MICROCRYSTALLINE CELLU-

LOSE: From Ireland: Biotech Pharma 1,000 kgs., Rs. 77,752.

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From Netherlands: Fairdeal De-

velopment Corpn., 14,400 kgs., Rs. 2,18,224.

MOLYBDENUM DISULPHIDE :

From FRG: Anand Engineers Pvt. Ltd., 100 kgs., Rs. 13,670; From UK: Asbestos Pkg & Mfg. C. Pvt. Ltd., 100 kgs., Rs. 17,800.

MOLYBDENUM TRIOXIDE :

From UK: Sudarshan Chemical Inds., Ltd., 300 kgs., Rs. 1,07,420.

MONOBUTYL TIN CHLORIDE:

From USA: Gandhi Parekh Investment Corpn., Ltd., 2,176 kgs., Rs. 2,77,332.

MONOCROTOPHOS TECH :

From Switzerland: Artee Minerals, 32,560 kgs., Rs. 21,99,250; Gupta Chemicals Pvt. Ltd., 8,140 kgs., Rs. 4,91,127.

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From Switzerland: Maharashtra Agro Intl., Development, 48.84 MT., Rs. 32,98,875.

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MONOETHYLENE GLYCOL :

From Saudi Arabia: Reliance Inds., 2,491.31 MT., Rs. 3,55,55,573; From Singapore: IDI Chemicals Ltd., 54.99 MT., Rs. 8,23,878; Shree Synthetics Ltd., 95,175 MT., Rs. 14,36,638.

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From Thailand: Food Specialities Ltd., 17,500 kgs., Rs. 3,11,955.

NAPHTHALENE CRUDE:

From Australia: Amai Rasayan Ltd., 241.22 MTs., Rs. 17,26,520; Atic Inds. Ltd., 68.64 MTs., Rs. 5,37,599; The Atul Products Ltd., 138.6 MTs., Rs. 8,68,304; Beta Naphthol Pvt. Ltd., 103.34 MTs., Rs. 7,27,400.

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15 MTs., Rs. 1,10,918; Anil Dye Chem Inds. Pvt. Ltd., 60 MTs., Rs. 4,78,474; BASF India Ltd., 15,000 kgs., Rs. 1,20,686; Dye & Dispersing Agent Pvt. Ltd., 105 MTs., Rs. 8,57,621; International Dyestuffs Inds., 60 MTs., Rs. 4,78,474; Jay Chemical Industries, 30 MTs., Rs. 2,39,237; Jaysynth Dyechem Pvt. Ltd., 60 MTs., Rs. 4,78,474; May Chemical Inds. Pvt. Ltd., 30 MTs., Rs. 2,41,372; Mayoga Chemicals P. Ltd., 30,000 kgs., Rs. 2,41,372; Nandesari Rasayanee Pvt. Ltd., 30 MTs., Rs. 2,38,009; Rahul Dyechem Inds. Pvt. Ltd., 60,000 kgs., Rs. 4,78,474; Vivek Dye Chem Inds. Pvt. Ltd., 32.4 MTs., Rs. 2,58,375; Zenith Ltd., 90 MTs., Rs. 7,17,710; From France: Henkel Chemicals (India) Ltd., 15,586 kgs., Rs. 1,56,696; From FRG: Distributors India Ltd., 48.6 MTs., Rs. 3,87,609; Southern Sea Foods Pvt. Ltd., 1,13,400 kgs., Rs. 9,52,337; Vishnu Chem Intermediates Ltd., 120 MTs., Rs. 8,27,343; From USA: Rang Udhyog, 175.27 MTs., Rs. 13,30,748.

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From Yugoslavia: Vishnu Chem Inds., 41,820 kgs., Rs. 3,18,865.

NEOPENTYL GLYCOL:

From FRG: Fibre Bond Inds., 5,000 kgs., Rs. 1,03,645; Marpol Chemicals Pvt. Ltd., 5 MTs., Rs. 1,23,200; Sekhsaria Chemicals P. Ltd., 16,000 kgs., Rs. 3,37,919; Unibond Industries, 2,000 kgs., Rs. 47,715.

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Citric Acid from Citurgia. The name that spells international quality

The name Citurgia is today synonymous with Citric Acid of the finest quality.

Citurgia caters to more than just one need in more than just one industry. Besides the traditional usage of Citric Acid in food, soft drinks, confectionery and drugs, today the uses of Citric Acid extend to new areas.

In the textile printing and dyeing industry, it provides STABLE pH conditions for polyester and nylon. As also for acrylic prints curing and cotton-resist printing. Citric Acid has successfully replaced imported Tartaric Acid because of its excellent quality, low costs and easy availability. Also, it is a very

safe acid compared to other organic and inorganic acid salts.

- Citric Acid prevents flavour deterioration, rancidity and discoloration in edible oils.
- It imparts an acidic taste to dry powdered drinks.
- It is also used as a descaling solution.

Citurgia Biochemicals Ltd. is the largest producer of high quality Citric Acid in India. Besides catering to the domestic demand, Citurgia's Citric Acid is exported to USA, Japan, Germany, Australia, Iran, Malaysia, Sri Lanka and other countries.



Citurgia Citric Acid-India's No. 1

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